THE

physical therapy

REVIEW

Volume 33 - Number 10 October 1953

Cerebral Palsy Program in Norway
— MOSSIGE and KNIGHT

Rehabilitation Goals in Pediatrics — FEUER

The Application of Neuromuscular Facilitation in the Treatment of Shoulder Disabilities
— VOSS, KNOTT and KABAT

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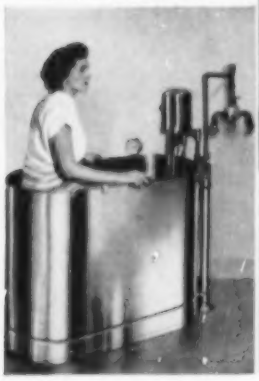

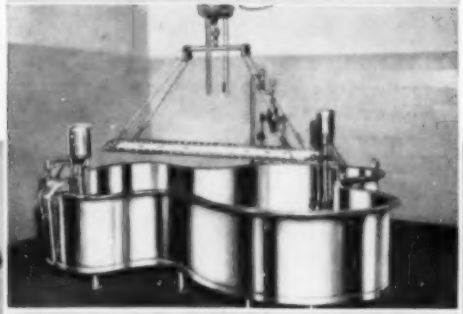

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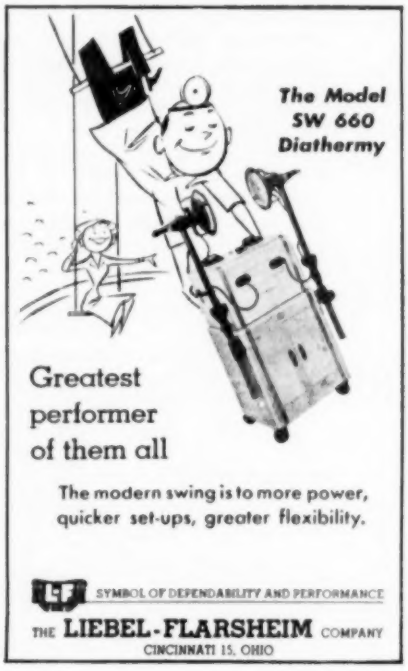
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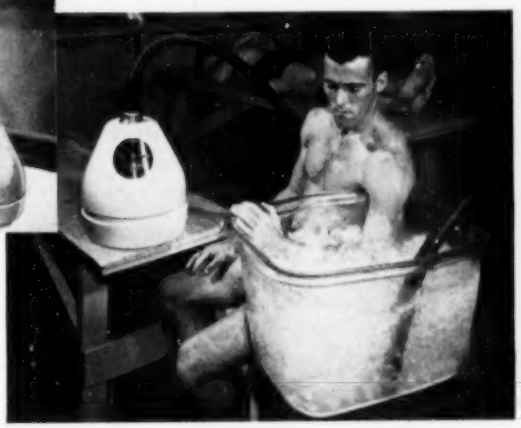

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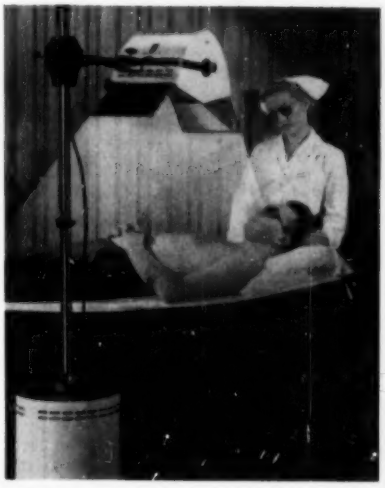

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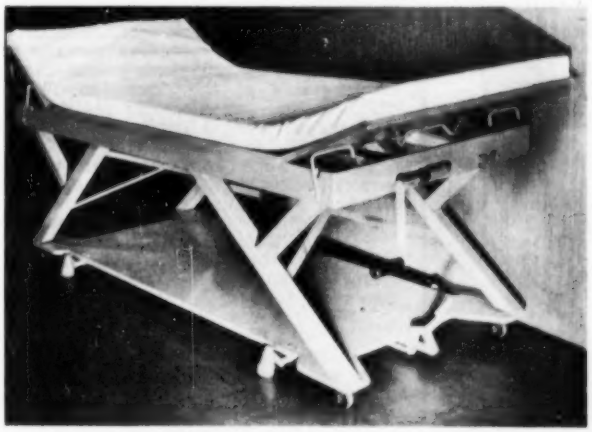

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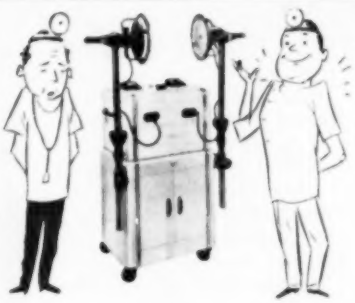

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Volume 33 October 1953 Number 10

Cerebral Palsy Program in Norway

As described by

Hanne Mossige, Norwegian physical therapist, to Dorothy Knight, B.A., O.T.R.

Introduction

In Oslo, Norway, within the last two years, there has emerged a treatment program for selected cerebral palsied children. It is a rigorous program, which accepts for treatment children with any degree of physical disability from infancy to twelve years of age. Mental disability, however, disqualifies a patient for clinical treatment although the parents, if they wish, may obtain advice from the clinic staff for carrying out a home treatment program.

Those directing and working in the program have been dealing successfully with several difficult problems, among them that of adequate cooperation on the part of parents. It is realized that effective treatment is impossible without cooperation on the part of the patient, and perhaps equally impossible without an even greater understanding of treatment aims by the parents. So they proceeded by carefully measured steps to provide tangible opportunities for measuring the sincerity of the desire for treatment. Before their child arrives at the Center, the parents are asked to supply furniture for his use. This consists of a chair and table set made to his measure either by the parents or built to their order. This procedure, of course, serves as a time and money saver as well as a motivating factor in securing the parents' cooperation with the program.

Aware that no one can cooperate in any undertaking without understanding the requirements of the situation, the directors at the Oslo Center removed much of the mystery that surrounds cerebral palsy for most parents. By doing this, it was found that they removed much of the fear as well. Often the fear of doing the wrong thing seems to paralyze otherwise helpful parents.

To accomplish an understanding of the problems of cerebral palsy, lectures are given to the parents by physicians and other members of the professional staff. All possible information regarding cerebral palsy and its relationship to their own child is provided. Nor is this parent education accomplished in a day. Parents attend these courses for from one to two weeks and in this scientific but helpful atmosphere they have time to consider the problem more objectively than ever before. They have an opportunity while their youngsters are being routinely examined to ask all the questions they like of the many specialists who were also their teachers or lecturers.

With the parents grounded in basic information, which includes much psychology, the youngster's own assistance is then enlisted. The patient himself is recognized at Oslo as being the *most important member of the team*. Any improve-

Hanne Mossige, Supervisor, Children's Clinic, State Hospital, Oslo, Norway.
Dorothy Knight, Occupational Therapist, Essex County Cerebral Palsy Center, Newark, New Jersey.

ment he shows is the result of his own work. Others may show him how, others may encourage him, others may even help him, but the real production of progress is up to him.

As a check on the effectiveness of parental learning, and, in turn, of parental instruction in later home treatment of the child, the following plan is used. The parents spend a fortnight at Oslo and leave their child there for inpatient treatment while they return home, having learned much. They receive a quarterly report from the clinic which may indicate that their child is making progress and will return to them within three months. When the child returns home the parents carry on treatment for six months or more. At the end of that time the case is reviewed. If progress has continued, indicating that both the parents and the child are honestly and persistently working concertedly at their problem, all is well. The child may then be readmitted to the center for further inpatient or outpatient treatment. But, if progress is considered inadequate, the case is closed except for occasional check-ups.

ADMITTING PLAN

To be admitted to the Center in the first place, children must be residents of Norway. District doctors, located throughout the country make applications for children from their respective districts. As much as eight days' travel, depending on horse and wagon, boat, railway, and bus has been involved for some patients in the treatment center. The cost of this transportation, for the child and one adult, is provided by the National Health Program. Maintenance for parents during their training period, however, is at their own expense. Treatment and maintenance for the child is provided up to two years without direct cost to the parents, although as citizens, they pay into the National Health Insurance program.

If, as an outpatient, the child's parents are living in Oslo, the child receives treatment three times a week and may also attend the kindergarten every day. Outpatients, whose parents are staying in Oslo for the purpose of the child's continued treatment, may receive treatments every day and may also attend the daily six-hour kindergarten sessions. Mothers of these children observe treatments and receive additional instructions. Outpatients may continue as such, without charge, as long as the treatment may be medically prescribed.

The screening process and tentative treatment include all types of medical examination and are accomplished in from one to two weeks. The parents' training course runs concurrently. A routine patient examination includes ear, eye, nose and throat, pediatric, orthopedic and neurological surveys, and a thorough examination by an experienced psychologist. A psychiatrist is provided for the child or the parents or both when indicated. An electroencephalogram and pneumoencephalogram also are routine for each child, although the latter is not included should the parents object.

If the child should be found to be mentally deficient, he is not accepted for treatment but may return home or be referred to an institution. One way of gaining parental acceptance of a child's intellectual involvement is to have the parents of the mentally deficient child observe treatment as it is being carried out with bright children and then observe treatment procedure with their own. By comparing their own with the normal child it has been found that these parents are better able to accept the situation without blaming themselves, the child, or treatment center personnel for the child's lack of progress.

TREATMENT PROCEDURE

The technics of treatment adopted by the Oslo Center are characterized by the elimination of many current adjuncts. Surgery has not been used to date in this particular clinic because its results are irreversible. The concept seems to be that if the patient is young and intelligent when treatment is begun and if treatment is adequate, there should be no reason to operate.

Braces have not been used for several reasons: one, lack of bracemakers in Norway who are experienced in cerebral palsy work; two, the basic concept held in regard to braces that, since the pathology is in the central nervous system and not in the limbs, bracing has not proven its case; and, three, the consideration that the greatest contraindication to bracing is the psychological effect braces have on the child and on his family.

Drugs have not been a part of the treatment program at Oslo, either, as their beneficial effects have not been conclusively demonstrated to the satisfaction of the directors.

The treatment procedures followed are characterized by simplicity, common sense, and an understanding of psychological and emotional factors. Emotional needs of the child are given basic consideration. His need for love, affection, admiration, and success is met, but he is not coddled. *He* is the one who must improve his own condition. Gesell's motor development gradients are basic in Norway, and the child is brought toward the motor development that is normal for

his age by beginning where he is and working through each stage successively.

Treatment of the very young infant (as young as three months) and of the severely involved begins with table work. For this the therapists work with the child completely unclothed believing that this aids the child in reconstructing a more complete body image from what has been something of a "half-chick" concept.

When working with very young babies it is important to change their position frequently sometimes every half hour. If they lack head control, as is often the case, care must be taken when they are lying face down to prevent any danger of suffocation. They should be encouraged to move at the earliest possible stage. Trinkets, for instance, should be hung on the side opposite to the one which the infant's head tends to turn. In actual treatment at the Center, these infants are given appropriate exercises and are carried back and forth over the therapist's shoulder in such a way that they must make the effort to get their heads up if they want to see what is going on around them.

While the actual period for individual treatment of each child is only one-half hour a day, six days a week, the children are under constant supervision the rest of the time and watched for carry-over of treatment aims. Time spent as inpatients at the clinic for the initial treatment period varies from three months to a year, depending on the case.

A daily, six-hour kindergarten session is provided for all inpatients and for most of the outpatients as well and this assures ample opportunity for socialization. The main purpose of the kindergarten, however, is to provide an optimum environment in which the child is intrigued and directed in the important process of completing an activity often with an interesting toy. It is here that he learns to concentrate, to "follow through," and to increase his excessively short attention span. Some opportunity for self-help and a good work-out with originally designed functional toys fulfills at least a modicum of occupational therapy needs. Feeding training, as such, is not given. The child is encouraged to cooperate while he is being fed, the idea being that when he is ready, he will feed himself. Each afternoon every child is given a thick slice of heavy, dark bread and most of them manage to eat it.

As part of their regular treatment, the children are given work for their facial muscles. This includes the training of lips to close the mouth as well as an awareness of the swallowing activity, and most of the droolers have shown marked improvement under this regimen.

Moving pictures are taken of most of the children at the time they enter. These pictures show them, unclothed, in supine and sitting positions and in some cases even more extensive views are taken. Pictures are taken again at a later date, and improvement shows up in a most dramatic manner. For any such improvement the child takes due credit, probably a positive factor in obtaining and maintaining good motivation.

All treatment is directed toward as normal an appearance as possible, from which it would seem to follow that normal function might best proceed. Table work is developed along the progressive gradient so ably clocked by Gesell and his associates, and a great deal of emphasis is placed on good posture at whatever stage the treatment is begun. Posture is believed to be very important as all movement begins and ends in posture; therefore the children work for good position and good motion from the very beginning in order to save time and energy later. They proceed on the principle that control in basic positions should be gained first.

In accordance with Gesell's observations that the infant begins to control his eyes first, the child is placed supinely on the plinth in anatomical position and if eye control is not already established, the eyes are treated first. The child moves, or attempts to move his eyes in all directions and for both near and far objects. In this connection the therapists have found that when the eyes wander the attention wanders too. So the child is obliged to "pay attention with his eyes" while the entire treatment is carried on. Actual eye exercises are followed by other facial work to overcome grimaces and to develop the ability to smile.

Work on head balance follows the few minutes spent each day on training of facial muscles. This is developed first from the supine position and when that has been achieved, from other positions. In placing such emphasis on head balance the rationale is based on the premise that "why should a child try walking, or anything else, if he cannot control his eyes and head to see where he is going."

In securing head balance, the chin is kept fairly close to the sternum to develop needed flexor tone. Control of the head and of the upper extremities is aided by work in front of a mirror.

The approach to walking is developed through creeping, crawling, kneeling, and sitting. Sitting and associated work with the upper extremities usually come first, the basic concept being that

unless you have control of eyes and head to see where you are going and the ability to accomplish functions with the hands when you get there, why be further frustrated by walking.

In accordance with another basic principle, that of looking as normal as possible, we return to the chair and table provided by the parents at the time the child entered the treatment center. The table is a sturdy object, with its 2 by 3 feet (six square feet) of surface at elbow height to the child when he is seated at it. A rim of molding is continuous around the back and sides to keep objects from falling off easily. However, there is no rim on the front edge nor is there a semicircular cut-out to surround the child. A comparable effect is obtained by the manner in which the wide arms of the chair slide under and contact the under surface of the table. This provides the physical security afforded by a cut-out but has the added advantage of looking like any other table.

The chair, made to the child's individual measurements, is not much wider than his body. The seat is made as deep from front to back as the child's femur is long. The height of the chair seat from the floor is about three-quarters of an inch more than the distance from the under side of the knee to the sole of the foot. This is to allow for skis used in stabilizing the feet. The back of the chair comes up to the midpoint of the scapulae, further encouraging good head balance and proper alignment of the occiput on the atlas. The chair itself, however, provides the means for other basic stabilization.

The ischial tuberosities are the basis of stability in the sitting position. For many of these cerebral palsied children, keeping the seat of the pants in the seat of the chair unassisted is all, and often more, than they can do without attempting anything else. This raises the question of how to establish fixed points from which to control function. This is met by taking two old nylon stockings, tacking the toes to the middle of the back edge of the chair seat, bringing the stockings forward under the child's body, up between his legs, drawing each stocking across the top of each thigh and then bringing the stockings together behind the child and tying them securely under the edge of the chair or under pegs set into the back legs of the chair below seat level. With this arrangement, the children soon discover that when they have a fixed point or so they can begin to control the levers of which their upper extremities are composed.

To take advantage of the plantar reflexes (extensor thrust) for walking readiness, the previously mentioned skis are brought into play. These skis, incidentally, were found to be the envy of normal children in Norway and are in no way suggestive of the "handicapped" stigma. The skis are relatively short strips of wood fastened together laterally and equipped with deluxe ski "binders," preventing the lower extremities from flailing about and keeping the soles in contact with a solid surface. This provides two more relatively fixed points from which to stabilize and control the upper extremities.

Gross arm motions are then begun from this stabilized sitting position, with the child sweeping blocks from the table. This type of activity, with infinite variations aimed at maintaining interest, is carried out in graded steps from the gross arm motions described through gross primitive grasp with large tops down to pincer grasp with thumb and index finger in opposition.

For some activities the work is placed on an easel-like stand on top of the table to keep it in a more nearly vertical plane. It has been found that this keeps the back and head up and eyes focused in the position later needed for walking. This chair and table ensemble usually is occupied, when needed, by the same child for two years or more. Various simple means of increasing its size as the child grows are used as indicated.

After eye and head control and upper extremity work are progressing nicely, unassisted sitting balance is considered next at the Oslo center. To sit well, a straight, strong back is required. Needless to say, the development of such a back is a necessity for good walking. One postural device to aid in this back treatment is sitting on the floor tailor fashion. A low, Japanese-style table is placed over the child's knees, helping to keep the legs in abduction and providing, as well, an excellent surface for finger painting or other activities.

As soon as advisable, a good deal of practice in standing up and sitting down is given. For this purpose a simple piece of furniture, a sort of three-in-one chair, is used. This chair might be described as the letter "H" projected into three dimensions. The "H" has a relatively high cross bar. Sitting and standing up is begun from this high sitting position provided when the cross bar is up. When sitting and standing can be accomplished readily from this position the "chair" is turned on its side, presenting a progressively lower sitting level. Then, before practicing getting up from the floor itself, the chair is turned with the cross bar nearer ground level. This progression provides the carefully graded steps so essential to the success, progress, and motivation of these children.

ORGANIZATION OF THE CENTER

In Norway, as in many other parts of the world, it was the parents who took the initiative in establishing a treatment center for the cerebral palsied children of that country. This organization became effective in 1950, and interestingly enough the founders of the group were parents who could not gain advantages for their own children since the child of one was over-age and the other was receiving special home treatment at the time. Nevertheless, these parents formed the nucleus of the group which eventually was able to make effective contacts with some of the able and interested doctors associated with the University of Oslo. Fortunately, the University had a newly built children's clinic in the hospital under its control in which there was a small unappropriated section that had been reserved for tuberculous children. Seven beds were made available there for young cerebral palsied inpatients.

During the first few months when the program was being established some humorous incidents were encountered by both the parent group and the therapists. While all of the special personnel required to treat the children were arranged for and originally paid by the parent group, the regular hospital personnel took over care of the youngsters who were inpatients. These good people were as nonplussed at having a group of cerebral palsied children on ward as was the proverbial hen with a hatching of ducklings. The nurses seemed to believe that if children were in a hospital they should be kept (for goodness sakes!) in bed when they were not receiving treatment. Nor could they comprehend why little children, even babies for that matter, might be held up by the ankles in reaction testing or in treatment. Apparently anything not understood is disliked and feared by most people.

As mentioned before, babies are carried over the therapist's shoulder to provide an adequate stimulus for lifting their heads. This stimulus may not be immediately effective and at one time in the "ancient history" of the Center, reports filtered up the higher echelons that dead babies were being carried about the hospital. This, and other misunderstood practices, were promptly and effectively defended so that now the cerebral palsied "ducklings" are an accepted and understood group. These incidents are mentioned only to show the need for more information about and more understanding of cerebral palsy by all people, even professional groups.

In spite of such nettling trials and obstructionist tribulations, the progress made at Oslo, under clear-cut medical direction, has stimulated both the medical profession and lay people. As a practical testimonial to this effect, three new centers, all patterned after the one in Oslo, have been opened in Norway within the past three months.

Rehabilitation Goals in Pediatrics

Samuel G. Feuer, M.D.

The goals of rehabilitation in pediatrics are varied and complex and merit consideration as an entity because the problems that are presented are so vastly different from those encountered in adults. This is quite understandable when it is realized that we are dealing with children from infancy to puberty, with different levels of intelligence and training, as compared to the adult who has reached his maximum level of mental capacity and physical accomplishment.

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Because of the growing interest in the pediatric phases of rehabilitation as demonstrated by the increasing number of hospitals, institutions, and centers devoted to these programs, it becomes more important than ever that a definite classification of the status of the involved children be established. Early in the consideration of these problems one is immediately confronted with the startling revelation that in a considerable number of cases the problem becomes one of habilitation and not rehabilitation. In outlining a rehabilitation program for the average adult with physical disability resulting from trauma or dis-

ease, we are confronted with the clinical picture of a person with a definite degree of education, knowledge, and vocational training, maturity, and the memory of the former performance of usual adult activities of daily living; added to these important items is the ability and desire to accept and participate in a rehabilitation program. On the other hand, in the case of children, we are confronted with numerous clinical pictures in which a child is referred for rehabilitation who has never walked before, has a speech or hearing impediment, or is mentally retarded. Some are presented to us with no knowledge or ability to perform the usual daily activities of a child of comparable age and these are definitely cases for "habilitation." The successful treatment of these children depends upon team-work of the pediatrician, physiatrist, therapists, teachers, neurologists, parents, and physicians in other specialties, and an understanding of the basic differences in the initial classification as presented below.

Classification:

1. The child whose major problem is that of a physical handicap.
   a. Present at birth, or acquired shortly after birth. Walking and other activities of daily living have not yet been acquired (birth to 18 months).
   b. Acquired after achieving some or all normal activities of daily living (18 months plus).
2. Children in whom deconditioning phenomena have resulted from acute or chronic disease, or surgical procedures or trauma.
3. The child with a severe physical handicap with normal mentality.
4. The child with severe physical and mental defects.
5. The mentally retarded child with no physical defects.

Case Illustrations

1. Case of habilitation.

This patient was admitted to the institution at the age of 16 months with a diagnosis of poliomyelitis. Manual muscle testing revealed severe paresis of both upper extremities particularly in the muscles of the shoulder girdle. The right lower extremity revealed moderate to severe paresis, and the left lower extremity revealed moderate paresis. There was total paralysis of the abdominals and a great loss of power in the musculature in the lumbar area.

The patient was placed on a program of rehabilitation which consisted of intensive physical therapy including muscle reeducation. Evaluations were made regularly and at the end of eight months there had been some return of function in the right lower extremity particularly at the hip. The upper extremities, while they showed some improvement, remained quite weak. With the cooperation of the Orthopedic Service, a long leg brace was placed on the patient's right lower extremity, and support in the form of a brace was given to low back and abdominals. The arduous process of possible ambulation was then begun in the gymnasium. Three months were required for the patient to attain some form of standing balance. During this time he received occupational therapy and efforts were made to teach him to use the left upper extremity functionally. After many months of occupational therapy and physical therapy the patient was able to walk and able to feed himself in a limited fashion.

This patient is now back home and his greatest future problem will be one of adequate vocational training.

2. Case of a normal child afflicted with poliomyelitis.

A 13 year old male was admitted to this institution from another hospital in August, 1952, with a diagnosis of poliomyelitis. Manual muscle testing revealed severe paralysis of both lower extremities, abdominals, back musculature, and muscles responsible for speech.

The patient was seen in consultation with the Orthopedic Service and a program of rehabilitation was mapped out for him which included physical therapy, occupational therapy, and speech therapy. Because of extreme paralysis he was treated twice daily in the Department of Physical Medicine and at the end of three months sufficient power had returned to the lower extremities to enable him to attempt standing. The abdominals showed a minimum amount of recovery, and concentrated effort was placed upon the possible restoration of muscles of the abdomen and back. The patient was seen by the Orthopedic Service and a drop foot brace was prescribed for the more affected lower extremity. Intensive rehabilitation was pursued and in January, 1953 he had recovered enough to warrant discharge from the hospital. Following his discharge treatment was continued on an outpatient basis three times weekly.

Long range planning for this patient must be along the lines of developing the vocational use of the upper extremities or training the child for one of the professions.

3. Case of intensive rehabilitation where ambulation could not be achieved.

A 10 year old female of normal intelligence with meningocele has been a patient in this hospital for the past several years. Upon the request of the Orthopedic Service, the patient was referred to this service for possible rehabilitation with the emphasis to be placed upon future ambulation. Long leg braces with hip locks and low back brace where fitted for the patient. Manual muscle testing revealed paraplegia with almost complete loss of motor and sensory power below the level of the umbilicus. In view of the minimal active motion in the both lower extremities it was decided to teach the patient a paraplegic "swing-through" gait. Heavy resistive exercises were then given to the upper extremities with particular emphasis upon strengthening of the triceps, latissimus dorsi, and pectoral musculature. At the end of a four-month period, standing in the parallel bars was begun. This was gradually changed to a "swing-to," followed by a "swing-through" gait in the parallel bars. Following this procedure, crutches were fitted and the

process of standing balance followed by the "swing-to" and "swing-through" gait was then carried on outside of the parallel bars. Some measure of success had been attained in this endeavor when the patient sustained a fracture of the left lower extremity (cause of fracture unknown). She was then immobilized for a period of three months and when able to return for therapy, the process of ambulation training had to begin all over again. Since this occurrence, the patient has never been able to follow through on a period of rehabilitation for a period of more than two months due to such causes as urinary disturbances, decubiti, and additional spontaneous fractures of the lower extremities. At the present time the patient is standing in the parallel bars again after having been immobilized for two months due to urinary disturbances.

This case presents a poor prognosis for physical activity. All efforts must be directed along educational lines to prepare this patient for professional, sedentary, or commercial clerical work.

4. Case resistive to rehabilitation.

This is a case which is presented to show the hopelessness of all procedures in the possible rehabilitation of a patient with a normal mentality. A 12 year old female with a diagnosis of severe athetosis was accepted for rehabilitation in spite of extreme involuntary motions because of psychology report of normal intelligence. Concentration was placed upon daily self care activities, possible ambulation, and speech therapy. The patient received one and one-half hours of active therapy daily five days weekly for a period of 17 months. At the end of this time speech has not improved and attempted walking with brace has proven unsuccessful because the patient cannot control her involuntary movements even in the parallel bars. Attempts to dress and feed herself have proven unsuccessful because of the involuntary movements of both upper extremities.

This type of patient presents an extremely poor prognosis for all phases of rehabilitation including vocation planning.

5. Reconditioning for a patient after a long confinement in bed.

This patient is a 10 year old male admitted to this institution approximately a year ago with acute rheumatic fever. Due to the patient's condition, complete bed rest was essential for about six months. At the end of this period he had made sufficient recovery and it was proposed to send him home. When he was allowed off the bed it was found that his walking was impaired to the point where the gait was both awkward and tiring. The patient was referred to this service where a reconditioning program was set up. This consisted of mat work, weight lifting, and resistive exercises to the entire body. After one month of this program, the patient had made sufficient recovery to warrant his going home.

From a consideration of these cases and others which confront us constantly, it becomes quite apparent that to achieve any considerable degree of success smooth teamwork is required. The pediatrician after thorough study is in a position to tell the physiatrist just how much physical stress can be placed on the child; the neurologist gives us a clear clinical picture of the mental and emotional status of the child. The orthopedist decides early whether the child will be a good candidate for surgery, bracing, or both. From these reports one can make an early appraisal of the level of expectancy for achieving any degree of habilitation or rehabilitation and in addition, project a clear picture as to where the greatest emphasis must be directed. Early in this phase of the program it is essential that the parents be incorporated in the rehabilitation team not only because they will play such a major part in supplementing actual treatment and education, but also because of their stabilizing influence on a child who presents emotional and psychological problems. It is of definite importance that they be taken completely into the confidence of the team and be given a clear picture of the level of expectancy. This becomes doubly important because the common acceptance of certain physical achievements, especially ambulation, has apparently become synonymous in the minds of the lay people with the term "rehabilitation," while the other important aspects are completely overlooked.

The usual program for a handicapped child is developed along the following lines.

1. Complete clinical and laboratory study.
2. Mental and physical evaluation including visual hearing or speech defects.
3. Accurate recording of physical defects including the range of motion and activities of daily living.

When the above information has been recorded, a conference is indicated by the professional team so that a long range program can be developed which should be directed not only along the lines of physical improvement but should take cognizance of the educational and future vocational status of the child. Participating in such a program will be physical, occupational and speech therapists, school teachers, psychologists, vocational instructors, social workers, and the parents. One can almost compare such a program to a carefully compounded medicinal prescription. It hardly seems necessary to mention, but should be emphasized, that the care of these children requires patience, kindness, tactfulness, and perseverance by all concerned. This becomes especially important and of challenging proportions, when the child leaves its sheltered surroundings and enters into the competitive phase of life. This is where the early, careful planning should demonstrate the fullest utilization by the child of his residual abilities on a competitive basis and not one based on sympathy and coddling. In this connection a recent trend in the final phases of a rehabilitation

program is worthy of mention. Specific reference is made to the concept of the sheltered workshop, where the aim is to assist handicapped individuals in achieving a degree of self support, independence and dignity, based on ability and achievements and not on sympathy. That there is a definite need for such centers to provide economic security to those who unfortunately cannot compete with people of greater physical and mental ability is not to be denied, and offers much hope for the eventual channeling of many cases, heretofore, classified as custodial.

CONCLUSIONS

The complex problems of rehabilitation in children have been presented with a classification of general case types. Several cases have been presented to illustrate the complexity of these problems. An attempt has been made to demonstrate the procedures for achieving the optimum in the habilitation and rehabilitation of children.

I wish to express appreciation to Mr. M. Chrystal, chief physical therapist at the Jewish Sanitarium and Hospital for Chronic Diseases, for his valuable assistance in the supervision of the cases described.

The Application of Neuromuscular Facilitation in the Treatment of Shoulder Disabilities

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Patients with shoulder disabilities, which include a variety of diagnoses such as subdeltoid bursitis, peri-arthritis and tendonitis in the acute, subacute or chronic phases, are commonly referred to the physical therapy department for treatment. They present complaints of pain, muscle spasm, and limited range of motion in varied degrees and a history of disability for a day, months, or even years. While it is probably true that few people go to their graves with a shoulder limited in range due to one of these common ailments, still to most physical therapists the painful shoulder is a problem and there is need for improvement in treatment procedures.

The usual treatment prescribed for these patients consists of some form of heat, frequently massage, followed by exercise designated to be active, passive, or a combination of these. Codman's exercises have been used popularly along with many other well known routines. Numerous devices have been tried to assist in increasing range of motion for the shoulder which does not respond to active exercise. The amount of time, money and effort spent in alleviating the painful shoulder is considerable. Therefore, a more effective approach which will help the patient to regain a normal range of pain-free motion in less time is desirable both from the patient's point of view and that of the physical therapist because it will help to ease the burden in the busy physical therapy department.

A new approach to therapeutic exercise is available in treatment of shoulder disabilities through technics of neuromuscular facilitation as developed by Kabat.† The first consideration must be given to patterns of motion which are basic in that other technics are superimposed upon them. These patterns are combinations of motions in which groups of muscles function together optimally as far as range of motion and power are concerned. They are spiral and diagonal in character because the muscles of the body from their origins to their insertions are aligned in a spiral and diagonal fashion, and because the joints of the body have a rotatory component which allows for greater range to be accomplished in a spiral and diagonal motion than is possible in a straight motion. These patterns were derived from natural motions of the living, moving body, whereas straight motions in therapeutic exercise descended from the anatomist's description of the cadaver.

Because these technics are based upon underlying physiological principles concerned with mechanisms of proprioception, response to resistance, response to stretch, mass movement patterns, and reversal of antagonists, they are specific in nature. Because they are specific, it is possible to analyze precisely the patient's needs and to plan logically how to best meet these needs.

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† The reader is referred to Permanente Bulletin Vol. X, Nos. 1-4, August, 1952, Studies on Neuromuscular Dysfunction XV, Arch. Physical Med. Vol. XXXIII, September, 1952, and to Proprioceptive Facilitation Technics for Treatment of Paralysis, The Physical Therapy Review, Vol. XXXIII, No. II, Feb., 1953.

The four diagonal patterns for the upper extremities are described. Each pattern has its antagonistic pattern. The flexion-adduction pattern (1) with its components of flexion, adduction, external rotation of the shoulder, flexion or extension of the elbow (elbow may remain straight) supination of the forearm, supination and radial flexion of the wrist, flexion of the fingers to the radial side, and flexion and adduction of the thumb is the direct antagonist of the extension abduction pattern (2) with its components of extension, abduction and internal rotation of the shoulder, flexion or extension of the elbow (elbow may remain straight), pronation of the forearm, pronation and ulnar extension of the wrist, extension of the fingers to the ulnar side and palmar abduction of the thumb. Flexion-abduction (3) is the direct antagonist of the extension-adduction (4) with their respective components.

In antagonistic patterns the completed or shortened range of one is the lengthened or beginning range of the other. The pattern of the motion which is to be emphasized, that is the pattern in which it is desired to gain range or power, is referred to as the agonist pattern and the pattern in which relaxation is desired is referred to as the antagonist pattern.

UPPER EXTREMITY PATTERNS OF MOTION

1. Flexion-adduction
   a. Scapular motion — rotation with abduction and elevation anteriorly.
   b. Scapulo-humeral motion — flexion and adduction with external rotation.
   c. Elbow motion — (elbow may remain straight) flexion or extension with supination of forearm.
   d. Wrist motion—flexion to the radial side with supination.
   e. Finger motion — flexion and adduction to radial side.
   f. Thumb motion — flexion and adduction.
2. Extension-abduction
   a. Scapular motion — rotation with adduction and depression posteriorly.
   b. Scapulo-humeral motion — extension and abduction with internal rotation.
   c. Elbow motion — (straight) flexion or extension with pronation of forearm.
   d. Wrist motion — extension to the ulnar side with pronation.
   e. Finger motion — extension and abduction to ulnar side.
   f. Thumb motion — palmar abduction (extension and abduction to ulnar side).
3. Flexion-abduction
   a. Scapular motion — rotation with adduction and elevation posteriorly.
   b. Scapulo-humeral motion — flexion and abduction with external rotation.
   c. Elbow — (straight) flexion or extension with supination of forearm.
   d. Wrist motion — extension to the radial side with supination.
   e. Finger motion — extension and abduction to radial side.
   f. Thumb motion — extension to radial side
4. Extension-adduction
   a. Scapular motion — rotation with abduction and depression anteriorly.
   b. Scapulo-humeral — extension and adduction with internal rotation.
   c. Elbow — (straight) flexion or extension with pronation of forearm.
   d. Wrist motion — flexion to ulnar side with pronation.
   e. Finger motion — flexion and adduction to ulnar side.
   f. Thumb motion — opposition (flexion and adduction to ulnar side).

There are also two "thrust" patterns in the adduction patterns. These combine elbow extension with ulnar extension of the wrist in the flexion adduction pattern and elbow extension with radial extension of the wrist in the extension adduction pattern. The starting or stretch position for these thrusts is the opposite of their finish or shortened range position.

Examination

The patient is tested for limitation of motion in all of the patterns by carrying the part passively through as much range as is possible without producing pain. Frequently, limitation may be present in all of the patterns and with limitation of the elbow, wrist, and hand as well as the shoulder. If so, all patterns must be considered in planning the treatment for this patient. Usually the flexion patterns are most involved, although it is limitation in the extension-abduction pattern which does not allow the female patient to tie her apron strings or the male patient to get his hand in his rear pocket.

Planning the program — maximal resistance

After the involved patterns have been determined, it is necessary to decide which technics of facilitation can best be used to help the pa-

tient to regain a normal range of motion and a pain-free shoulder. Technics are specific for specific problems but maximal resistance is a primary requisite if technics are to accomplish their purposes. It is only through maximal resistance that maximum relaxation of antagonists and the most rapid gains in range and strength can be achieved. In definition, maximal resistance is the greatest amount of resistance which can be given to muscular contractions. When applied to the isometric (hold) contractions, resistance must be maximum without breaking the hold. When applied to the isotonic (active) (push or pull) contraction, resistance must be maximum but allowing for motion to be accomplished slowly through the active range with maximum effort on the part of the patient. In all technics of facilitation maximal resistance promotes subsequent relaxation of antagonists, allows the patient to accomplish range without pain and develops power in muscles weakened through disuse.

Traction applied to the part while technics are performed is very helpful in that it separates the joint surfaces and facilitates the proprioceptive mechanisms about the joint. Traction has long been applied by physical therapists in exercising painful joints but it is even more effective when patterns are used because the rotatory components of muscles and joints are being considered.

Rhythmic stabilization

In the shoulder where pain and muscle spasm are present to a marked degree and any attempt at active motion is painful, there are two technics which can be used to advantage. It may be desirable to teach the patient the patterns and technics on the normal shoulder so that both patient and therapist are confident that directions will be understood. The first of these is rhythmic stabilization which is a reversal of antagonists technic with only isometric (hold) contractions of the muscle. The arm is carried passively to the joint just below the painful range. The patient is then instructed to hold the arm rigid or still (co-contraction of antagonists). The therapist applies resistance alternately to the antagonist pattern and the agonist pattern; all components of the pattern are considered and resisted maximally but never break through the patient's hold. This means that there is no joint motion allowed. If resistance is applied maximally with only isometric contraction, pain is minimal or nonexistent. This procedure is repeated two or three times until a build-up in power is felt. The last "hold" is given to the agonist pattern and should be prolonged and maximal. Following this, the patient is told to relax and either lowers his arm in the antagonist pattern or brings it down against resistance. After allowing the patient to rest briefly, he should be asked to move the part actively through as much range as is possible without pain. Rhythmic stabilization may be repeated and further gains in range obtained due to relaxation of muscles of the antagonist pattern. It is even more effective to ask a patient to contract actively (isotonically) against maximal resistance in the agonist pattern following rhythmic stabilization. This must be done directly from the last isometric (hold) contraction of the agonist pattern without allowing relaxation to occur and with maximal resistance at the wrist. This will help the patient to make maximum gains in range most rapidly but it is suggested that it be tried only after the therapist is confident as to pattern, maximal resistance and has learned to feel the build-up in power which rhythmic stabilization achieves.

Hold-relax

The second technic of value in alleviation of acute symptoms is hold-relax which includes isometric (hold) contraction followed by relaxation and also is applied alternately to the antagonist and agonist patterns just below the point of pain. After several alternations, the patient is asked to move the part actively in the agonist pattern as far as possible whereupon the procedure may be repeated. Here again, maximal resistance to all components of the pattern with especial attention to rotation is extremely important. Also, maximal resistance to the hand in order to facilitate contraction in the shoulder muscles is of prime necessity.

Slow-reversal-hold-relax

In the shoulder where pain and muscle spasms have subsided to the subacute stage, slow-reversal-hold-relax may be the technic of choice. This technic consists of an isotonic (active) contraction in the antagonist pattern followed by an isometric (hold) contraction, followed by voluntary relaxation. This procedure is performed allowing only minimal joint motion to occur in the direction of the antagonist pattern. After relaxation of the antagonist has occurred, the patient performs an isotonic (active) contraction in the agonist pattern with maximal resistance but allowing as much range as possible to be achieved. The patient then contracts isometrically (holding) in the agonist pattern followed by repeated isotonic (active) contractions through the iso-

metric (hold) contraction. Slow-reversal-hold-relax may be repeated in order to make further gains in range.

Rhythmic stretching

In the shoulder where muscle spasm is no longer a factor but where limitation of range persists and there is definite evidence of contracture, it is possible to relieve tightness of structures about the joint by using rhythmic stretching. Because actual stretching is a necessity there is some pain produced during the procedure but if skillfully applied with proper attention paid to the components of the pattern, there should be no pain following the application of rhythmic stretching. The arm is carried actively to the point of limitation in the agonist pattern. At this point, the antagonist pattern is stretched by the therapist carrying the arm into the painful range momentarily and taking it back to the pain-free range. The patient is instructed to contract actively in the agonist pattern throughout the stretching procedure. When the stretch and isotonic (active) contraction are synchronized, the pain is tolerable and noticeable gains in range can be achieved readily. After several repetitions, the patient contracts isometrically (holding) in the agonist pattern, then isotonically (pushing or pulling) in repeated contractions until maximum range is achieved. Rhythmic stretching is very different from straight, passive stretching and if properly carried out, these procedures bear no resemblance to each other.

Slow reversal

The technics presented are those used primarily for gaining range of motion. For development of strength and power slow-reversal is a very adequate technic. The patient pulls or pushes actively (isotonically) in the antagonistic pattern, then without allowing relaxation to occur, reverses into the agonist pattern. It may be desirable to have the patient work only through partial range of the antagonistic pattern and then work through full range of the agonist pattern. After several reversals the patient is asked to hold (isometric) and then pull or push from the hold in the agonist pattern. The patient repeats the active (isotonic) contractions in the agonist pattern until fatigue occurs. This contributes to the development of endurance. Active recuperation may be induced by having the patient reverse into the antagonist pattern or he may be allowed to rest and then repeat from the beginning. In order to have a completely functional result it is important that maximum strength be developed throughout the range of all of the patterns.

Reinforcement

As has previously been pointed out, contraction in the agonist pattern may be facilitated through maximal resistance to the components of the pattern with resultant overflow of power to the weaker muscle groups. Further facilitation may be produced by reinforcement of the involved extremity through use of the normal upper extremity in bilateral symmetrical, bilateral asymmetrical, or reciprocal patterns. Resistance to the normal extremity is given maximally and initiated before resisting the involved extremity. Use of the normal extremity for reinforcement is desirable not only because of its direct effect upon the involved joint, but also because in this way the posture of the upper spine and shoulders can be improved.

Supplementary exercise

Supplementary exercise is carried out through use of wall pulleys. Patients work in the patterns to be emphasized using as much resistance as will still allow for maximum active range. The motion is repeated as many times as the patient can complete the active range. The patient is also instructed to perform the patterns actively at home in order to maintain maximal carry-over of range and relaxation obtained during the treatment session. Here the emphasis is placed upon frequency rather than repetitions.

Patients who have symptoms which are described as acute or sub-acute respond dramatically to this type of exercise procedure with notable gains in range of motion and lasting relief of pain after one to three treatments.

CASE REPORT

A case report is presented in order to show the management and result obtained in a patient whose shoulder problem was of long standing duration, who had been treated with various accepted procedures without beneficial results, and who was given a prognosis of limited function.

This patient was treated with combinations of diathermy or infra-red and exercise technics, as outlined in the paper. Massage was given briefly but was discontinued because of pain reaction in the scarred area at the site of the operation. For brevity's sake, a chronological report of events and results is presented rather than a lengthy description of the treatment procedure. The patient was treated 3 to 5 times per week for ten

months, except for one vacation period of two weeks.

A 51-year old white female housewife had a history of shoulder pain, with onset in August, 1951. She was treated symptomatically at the medical clinic and in January, 1952, received a course of deep X-ray treatment and procaine injections without relief. Following this procedure, the patient was referred to the orthopedic service. X rays of the shoulder revealed calcium deposits in the soft tissues above the greater tuberosity of the humerus. On April 9, 1952, transplantation of the right biceps tendon was performed. The patient was discharged from the hospital four (4) days later. One month later she was referred to physical therapy when no active motion and marked atrophy of all muscles of right upper extremity were present.

On May 19, 1952 active motion (all measurements were done in traditional straight motion) was recorded as follows: abduction—55°, forward flexion—90°, external rotation—10°, internal rotation—20°. The patient was admitted to the hospital July 18th for manipulation in an attempt to hasten further gains in range of motion although she had shown gradual progress. Three days following manipulation there was marked pain and protective muscle spasm and no active motion present. Patient had been started on 50 mg. cortisone daily immediately post-manipulation. Physical therapy resumed —infra-red followed by rhythmic stabilization.

Cortisone was discontinued on August 4th because of undesirable side effects. Active motion on Aug. 7, 1952; abduction—90°, forward flexion—130°, external rotation—50°, internal rotation—55°. Patient was seen in orthopedic clinic and given a prognosis of limited function with probability of no further gains in range of motion.

Started on supplementary pulley program in gymnasium Oct. 2nd. Active motion; true abduction—90°, further abduction—103°, forward flexion—140°, external rotation—50°, internal rotation—83°.

On return from vacation on Oct. 20th active motion and abduction—90°, further abduction—98°, forward flexion—140°, external rotation—40°, internal rotation —52°. Two weeks later—abduction—90°, further abduction—115°, forward flexion—160°, external rotation—52°, internal rotation—75°.

Examination on March 23, 1953 revealed active motion still somewhat limited but rotation essentially normal. Patient was instructed in a home program using dumbbells and was told to return every two weeks for a checkup.

On July 7, 1953 range of active motion was; abduction—90°, further abduction—118°, forward flexion—162°, external rotation—90°, internal rotation—81°. Patient feels no limitation in activity due to pain or weakness although the scarred area is still sensitive to touch.

Comment

This patient was extremely cooperative during her intensive course of treatment in spite of her early disability, pain, and apprehension. From within a month following the manipulation, she performed all of her own housework, including strenuous activities, such as removing wallpaper from a room in her home. She now performs all home-making and gardening activities easily.

With early physical therapy, it is probable that many of this patient's problems could have been eliminated and prevented. Her case was presented not because of dramatic response as is seen in early and uncomplicated cases, but because of the improved function gained after a prognosis of limited function had been made. This is evidenced by gains in range in abduction of 28°, forward flexion 32°, external rotation 40° and internal rotation 26° from the time the prognosis was given. The remaining limitation in range is in the flexion abduction and extension abduction patterns, which are the patterns most closely related to the normal functioning of the biceps muscle with its synergists and antagonists.

SUMMARY

The authors have presented a program of exercise for shoulder disabilities which has been used for the past year in a series of thirty-six patients with more satisfactory results than have been gained heretofore. There are several generalities which deserve emphasis:

1. Patterns of motion are natural motions and the components of the pattern must be considered; i.e., supination occurs in the flexion patterns as does external rotation.

2. Maximal resistance is of prime importance but isometric (hold) contractions are not broken by the therapist and isotonic (active) contractions must occur directly from the isometric contraction after maximum "hold" is obtained.

3. Technics are specific for solving specific problems and, therefore, it is essential that the patient's problems be carefully analyzed.

4. Repeated isotonic (active) contractions are performed against maximal resistance but allowing for maximal gain in range of motion. This is necessary in order to develop power and endurance throughout the active range.

5. In the shoulder where marked pain and muscle spasm are present, rhythmic stabilization and hold-relax with no joint motion are the technics of choice.

6. Rhythmic stretching is used only where there is limitation without muscle spasm.

7. Slow reversal followed by repeated active (isotonic) contractions in the agonist pattern is the technic to be used for development of power and endurance throughout the active range of all patterns and is essential for a completely functional result.

8. Verbal commands must be accurate and understood by the patient. When isometric contraction is desired, the command is "hold." Isotonic (active) contractions require commands "push" or "pull." "Pull" is used in active contractions of the adduction patterns and "push" is used in the abduction patterns. The command commonly used in the thrust patterns is "shove." The command for voluntary relaxation is "relax" or "let go."

9. Optimum cooperation of the patient is ob-

tained by having the patient understand thoroughly what he is to do. Instruct the patient by teaching him how to follow commands on his normal extremity.

Experience has demonstrated that where techniques of neuromuscular facilitation are skillfully applied in the treatment of shoulder disabilities, the patient is more amenable to treatment, and pain and limitation of motion subside more rapidly than when other forms of exercise are used.

A Unit Conversion Table for the Electromagnetic Spectrum

Wilbur R. Gregory, B.S.

The unit conversion table was designed primarily for use by students. It offers a rather simplified method by which wavelengths may be converted from one unit of length to the other hurriedly. The meter is the basic unit of length in the metric system and every other unit of length is expressed in terms of it. It is admitted that this conversion of units is merely the change of the decimal point, but it may be simpler to express units in terms of exponentials.

In order to obviate the use of this table a review of exponents may be helpful. The exponent is the number of times the base 10 is multiplied by itself. For example,

$$10^3 = 10 \times 10 \times 10 = 1000$$

The following is a partial list of powers of 10:

1. $10^0 = 1$
2. $10^1 = 10$
3. $10^2 = 10 \times 10 = 100$
4. $10^3 = 10 \times 10 \times 10 = 1{,}000$
5. $10^4 = 10 \times 10 \times 10 \times 10 = 10{,}000$
6. $10^5 = 10 \times 10 \times 10 \times 10 \times 10 = 100{,}000$
7. $10^6 = 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1{,}000{,}000$

In the case of a negative exponent the reciprocal of these values are used:

1. $10^{-1} = \frac{1}{10^1} = 0.1$

2. $10^{-2} = \frac{1}{10^2} = \frac{1}{10 \times 10} = \frac{1}{100} = 0.01$

3. $10^{-3} = \frac{1}{10^3} = \frac{1}{10 \times 10 \times 10} = \frac{1}{1{,}000} = 0.001$

4. $10^{-4} = \frac{1}{10^4} = \frac{1}{10 \times 10 \times 10 \times 10} = \frac{1}{10{,}000} = 0.0001$

In expressing a number as an integral power of 10 the decimal point is moved to the right of the first integer. The exponent is the number of places the decimal point has been moved. If the decimal point is moved to the left the exponent is positive and if to the right, negative. For example, to express 100 as a power of 10 the decimal point has to be moved two places to the left (1.00); therefore the exponent of 10 will be 2 and positive (1.00×10^2). In converting 0.01 the decimal point is moved two places to the right (001.); therefore the exponent is 2 and negative ($001. \times 10^{-2}$).

Examples:

1. $10 = 10^1$
2. $100 = 1.00 \times 10^2 = 10^2$
3. $1{,}000 = 1.000 \times 10^3 = 10^3$
4. $10{,}000 = 1.0000 \times 10^4 = 10^4$
5. $0.1 = 1. \times 10^{-1} = 10^{-1}$
6. $0.01 = 01. \times 10^{-2} = 10^{-2}$
7. $0.001 = 001. \times 10^{-3} = 10^{-3}$
8. $0.0001 = 0001. \times 10^{-4} = 10^{-4}$

The only other operation involving exponents necessary for our purpose is multiplication. To multiply two numbers expressed as powers of 10 the exponents are added algebraically. When both exponents are positive the sum of the exponents gives the correct exponent of the product. Example: $10^2 \times 10^3 = 10^{2+3} = 10^5$. This can be verified by multiplying $100 \times 1{,}000$ to obtain

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TABLE I

Prefix	*Fraction or multiple of the basic unit*	*Power of 10*
micro micro	$\frac{1}{1,000,000,000,000}$	10^{-12}
milli micro	$\frac{1}{1,000,000,000}$	10^{-9}
micro	$\frac{1}{1,000,000}$	10^{-6}
milli	$\frac{1}{1,000}$	10^{-3}
centi	$\frac{1}{100}$	10^{-2}
deci	$\frac{1}{10}$	10^{-1}
kilo	1,000	10^{3}
mega	1,000,000	10^{6}

$100,000 = 10^5$. If one of the exponents is negative the smaller exponent is subtracted from the larger; the sign of this exponent will be the same as the larger exponent. Examples:

$$10^2 \times 10^{-3} = 10^{-1};\ 10^{-2} \times 10^3 = 10^1$$

When both exponents are negative the exponent of the product is negative and is the sum of the two exponents. Example: $10^{-2} \times 10^{-3} = 10^{-5}$. All the above examples may be verified. This procedure is useful since conversion from unit to unit merely involves the multiplication of the appropriate factor of 10.

Conversion is based on a system of prefixes each of which denotes what fraction or multiple of the basic unit it is. These prefixes have the same meaning whether the basic unit is length (meter), mass (gram), or electrical units (farads, watts, etc.). The prefix, its fraction or multiple of the basic unit, and the power of 10 by which any number expressed in terms of the unit must be multiplied to be converted into the basic unit is given in the following table (Table I). For ex-

TABLE II

Unit to be converted	Unit to be converted to								
	kilo	meter	deci	cm	milli meter	micron	milli micron	Ang.U.	micro micro
micro micro	10^{-15}	10^{-12}	10^{-11}	10^{-10}	10^{-9}	10^{-6}	10^{-3}	10^{-2}	
Ang.U.	10^{-13}	10^{-10}	10^{-9}	10^{-8}	10^{-7}	10^{-4}	10^{-1}		10^{2}
milli micron	10^{-12}	10^{-9}	10^{-8}	10^{-7}	10^{-6}	10^{-3}		10^{1}	10^{3}
micron	10^{-9}	10^{-6}	10^{-5}	10^{-4}	10^{-3}		10^{3}	10^{4}	10^{6}
milli meter	10^{-6}	10^{-3}	10^{-2}	10^{-1}		10^{3}	10^{6}	10^{7}	10^{9}
cm	10^{-5}	10^{-2}	10^{-1}		10^{1}	10^{4}	10^{7}	10^{8}	10^{10}
deci	10^{-4}	10^{-1}		10^{1}	10^{2}	10^{5}	10^{8}	10^{9}	10^{11}
meter (basic unit)	10^{-3}		10^{1}	10^{2}	10^{3}	10^{6}	10^{9}	10^{10}	10^{12}
kilo		10^{3}	10^{4}	10^{5}	10^{6}	10^{9}	10^{12}	10^{13}	10^{15}

To convert a number expressed in units listed in the left-hand column to any other unit, multiply the number by the factor, listed in the appropriate column to the right of the unit to be converted.

TABLE III

Wavelength									Electro-Magnetic Spectrum	Frequency in cycles/second
kilo	meter	deci	cm	mm	micron	mμ	Ang. U.	micro micro		
10^{6}	10^{9}	10^{10}	10^{11}	10^{12}	10^{15}	10^{18}	10^{19}	10^{21}		
10^{5}	10^{8}	10^{9}	10^{10}	10^{11}	10^{14}	10^{17}	10^{18}	10^{20}		10^{0}
10^{4}	10^{7}	10^{8}	10^{9}	10^{10}	10^{13}	10^{16}	10^{17}	10^{19}		10^{1}
10^{3}	10^{6}	10^{7}	10^{8}	10^{9}	10^{12}	10^{15}	10^{16}	10^{18}	Electrical	10^{2}
10^{2}	10^{5}	10^{6}	10^{7}	10^{8}	10^{11}	10^{14}	10^{15}	10^{17}		10^{3}
10^{1}	10^{4}	10^{5}	10^{6}	10^{7}	10^{10}	10^{13}	10^{14}	10^{16}		10^{4}
10^{0}	10^{3}	10^{4}	10^{5}	10^{6}	10^{9}	10^{12}	10^{13}	10^{15}	Long Wave	10^{5}
10^{-1}	10^{2}	10^{3}	10^{4}	10^{5}	10^{8}	10^{11}	10^{12}	10^{14}		10^{6}
10^{-2}	10^{1}	10^{2}	10^{3}	10^{4}	10^{7}	10^{10}	10^{11}	10^{13}	Short Wave	10^{7} } Radio
10^{-3}	10^{0}	10^{1}	10^{2}	10^{3}	10^{6}	10^{9}	10^{10}	10^{12}		10^{8}
10^{-4}	10^{-1}	10^{0}	10^{1}	10^{2}	10^{5}	10^{8}	10^{9}	10^{11}		10^{9}
10^{-5}	10^{-2}	10^{-1}	10^{0}	10^{1}	10^{4}	10^{7}	10^{8}	10^{10}	Microwave (radar)	10^{10}
10^{-6}	10^{-3}	10^{-2}	10^{-1}	10^{0}	10^{3}	10^{6}	10^{7}	10^{9}		10^{11}
10^{-7}	10^{-4}	10^{-3}	10^{-2}	10^{-1}	10^{2}	10^{5}	10^{6}	10^{8}		10^{12}
10^{-8}	10^{-5}	10^{-4}	10^{-3}	10^{-2}	10^{1}	10^{4}	10^{5}	10^{7}	Far Infra-red	10^{13}
10^{-9}	10^{-6}	10^{-5}	10^{-4}	10^{-3}	10^{0}	10^{3}	10^{4}	10^{6}		10^{14} Near Infra-red
10^{-10}	10^{-7}	10^{-6}	10^{-5}	10^{-4}	10^{-1}	10^{2}	10^{3}	10^{5}		10^{15} Visible
10^{-11}	10^{-8}	10^{-7}	10^{-6}	10^{-5}	10^{-2}	10^{1}	10^{2}	10^{4}	Short U.V.	10^{16} Long Ultraviolet
10^{-12}	10^{-9}	10^{-8}	10^{-7}	10^{-6}	10^{-3}	10^{0}	10^{1}	10^{3}		10^{17} Grenz Rays
10^{-13}	10^{-10}	10^{-9}	10^{-8}	10^{-7}	10^{-4}	10^{-1}	10^{0}	10^{2}	X-Rays	10^{18}
10^{-14}	10^{-11}	10^{-10}	10^{-9}	10^{-8}	10^{-5}	10^{-2}	10^{-1}	10^{1}		10^{19}
10^{-15}	10^{-12}	10^{-11}	10^{-10}	10^{-9}	10^{-6}	10^{-3}	10^{-2}	10^{0}		10^{20} Neutrons; Gamma Rays
10^{-16}	10^{-13}	10^{-12}	10^{-11}	10^{-10}	10^{-7}	10^{-4}	10^{-3}	10^{-1}		10^{21}
10^{-17}	10^{-14}	10^{-13}	10^{-12}	10^{-11}	10^{-8}	10^{-5}	10^{-4}	10^{-2}	Cosmic Rays	10^{22}

ample, milli prefixed to the basic unit, meter (millimeter) is $\frac{1}{1,000}$ of a meter; and 15 millimeters is $\frac{15}{1,000}$ or 15×10^{-3} (0.015 meters). It must be remembered that the result is expressed in the basic unit. Since 1 mm. $= \frac{1}{1,000}$ meter, it follows that 1 meter = 1,000 mm. Thus, the reverse process of converting meters to millimeters is accomplished by multiplying millimeters by 10^{3}.

The use of the Unit Conversion Table (Table

II) gives the factor by which a number in any unit must be multiplied to be expressed in any other unit. For example, 150 centimeters may be converted to millimeters by multiplying by 10^1 ($150 \times 10^1 = 1500$ mm), to meters by multiplying by 10^{-2} ($150 \times 10^{-2} = 1.50$ meters), to Angstrom units by multiplying by 10^8 ($150 \times 10^8 = 1.50 \times 10^2 \times 10^8 = 1.5 \times 10^{10}$ Angstrom units). As pointed out earlier, this table may be used for basic units other than length. For example, 2500 watts is equal to 2500×10^{-3} kilowatts (2.5 kw.).

The Unit Conversion Table is the basis of the table for the Electromagnetic Spectrum (Table III). With this table any wavelength (any factor of 10, any unit) may be converted to any other unit by simply reading across the table to the appropriate column. In terms of the metric unit table headings all factors of 10 on one line are equivalent.

The electromagnetic spectrum on the right shows an approximate relation between wavelengths and frequencies in cycles per second. A shortwave radio wavelength on the electromagnetic spectrum may have a wavelength of 15 meters which will fall between 10^1 and 10^2 in the meters column; 15 meters is equal to 1.5×10^1 meters, 1.5×10^3 centimeters, or 1.5×10^{11} Angstrom units, etc. To calculate the exact frequency, the formula $c = f\lambda$ must be used, where $c = 2.9978 \times 10^{10}$ centimeters per second (speed of light), f = frequency in cycles per second, and λ = wavelength in centimeters.

Calculation:

$$f = \frac{2.9978 \times 10^{10} \text{ cm/sec}}{1.5 \times 10^{3} \text{ cm/cycle}} = 2 \times 10^{7} \text{ cycles/sec}$$

A frequency of 2×10^7 cycles per second is equal to 20,000,000 cycles per second. This frequency is greater than 10^6 and less than 10^7 cycles per second. Thus an approximate relationship is seen between wavelengths and frequencies. A wavelength of the above frequency is an example of shortwave diathermy.

SUMMARY

A method for converting one unit to another in the expression of wavelengths of the electromagnetic spectrum has been presented, primarily for use by students. Since an understanding of exponents is necessary some of the basic principles have been reviewed.

The author wishes to express appreciation to Sedgwick Mead, M.D. and Miss Emily Mueller, of Washington University School of Medicine, St. Louis, Missouri for their suggestions on the Unit Conversion Table.

IMPORTANT

Notice to all Members

A directory of members will be printed in December. Addresses to be used will be those on file in the National Office on November 1, 1953. Any corrections of your name or address must be received in this office before November 1 if they are to appear in the directory.

Suggestions from the Field

A Table for Exercises in the Prone Position*

J. C. Goldthwait, M.D., and R. M. Lieber

It has been observed for many years by physical therapists that certain exercises are more effectively performed with the patient in the prone position. This seems to be especially true of patients with various types of arthritis, and it has been the practice at the Robert Breck Brigham Hospital to start prone position exercises early with these patients, particularly when shoulder, spine, or hip involvement is present. Certain obvious mechanical advantages can be obtained in this position. Extension of the spine and hips against gravity can be performed best this way and pendulum exercises of the shoulder are most easily done with the patient prone and the arm hanging over the edge of the support. We have observed, moreover, that in certain patients movements of the extremities in which the mechanical factor is not important can be more easily executed when the patient lies face down.

The subject of this paper is a practical one: the construction and use of a physical therapy table. The purpose of the table is to provide a means of obtaining easily full range of motion of the extremities with the patient in the prone position. The principle is simple. The table top is divided into three sections. The center section supports the body and remains stationary. The head and foot sections support the arms and legs respectively and can be lowered to produce the desired degree of motion. In figures 1 to 4 are shown the details of construction of the model built at the Robert Breck Brigham Hospital. Electric motors working through reduction gears turn drums, on which are wound wires attached to the four corners of each of the movable table tops. Switches at the side of the table within easy reach of the physical therapist control the motors, and limit switches automatically stop the table tops at the fully raised and fully lowered positions. Thus, with the patient's trunk supported, the level of the sections supporting the extremities can be quickly and simply controlled. Each section of the table top is covered with foam rubber over which is fastened a firm plastic cover. This provides a sufficiently soft surface for cushioning the body but does not result in appreciable loss of fixation of the trunk or extremities.

The patient can be rolled from bed or litter directly onto the table and into the prone position with a minimum of discomfort and with very little aid from the physical therapist. De-

From the Physical Therapy Department, Robert Breck Brigham Hospital, Roxbury, Massachusetts.

*This study was supported by the New England Arthritis and Rheumatism Foundation.

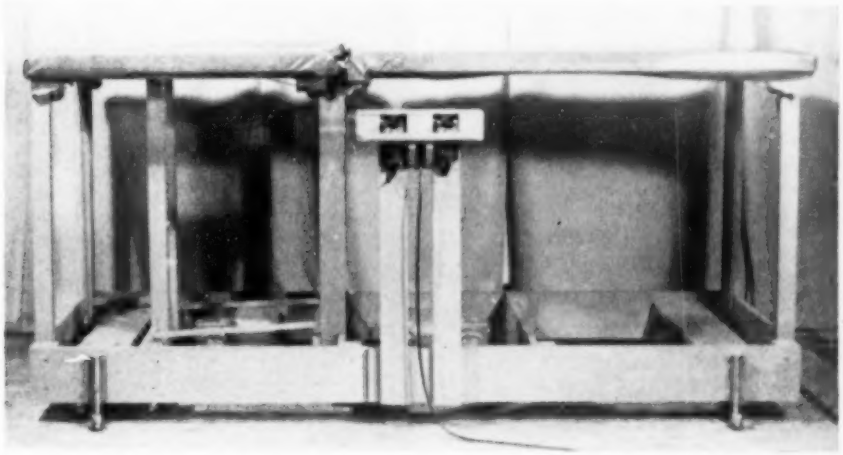

Figure 1. Table in normal position.

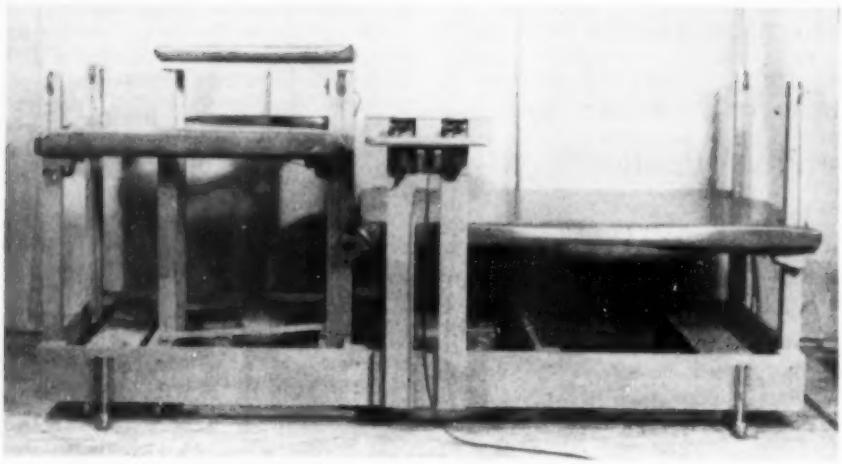

Figure 2. Table with arm and leg sections partly lowered.

pending on the degree of disability, this transfer from supine to prone position may be accomplished by the use of a draw sheet or simply by guidance and support of the affected parts. The patient is placed so that the anterior superior iliac spines are at the level of the midtable break: thus when one lowers the leg section of the table, free hip motion is obtainable. When the arm section is lowered, shoulder joint and shoulder girdle movements may be performed. The trunk is supported at all times by the central section of the table. Usually the patient's head rests on his chin, but he may easily be shifted forward so that the head and neck are free of support or, if weakness or pain requires, a headrest can easily be arranged.

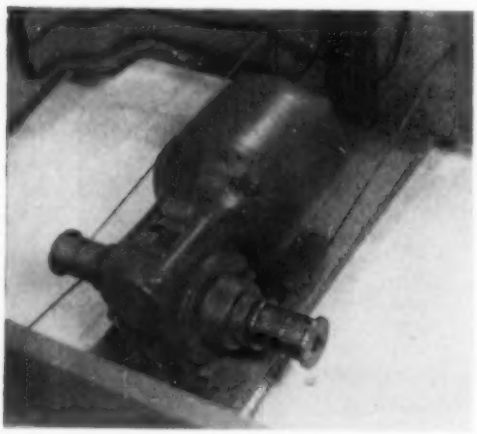

Figure 3. Detail of motor.

In a comfortable prone position, our patients have carried out a program of exercises which we feel has been of definite benefit, particularly when there has been weakness of the extensors of the spine and hips, and when pendulum exercises for the arms have been desirable. We have started the program when the atrophy of disuse or the actual disease process has made assistive exercises necessary. We have observed that the transition to active motion against the force of gravity has been more rapid than formerly, therefore, the use of resistance to increase muscle strength has been forwarded. For these resistance exercises a DeLorme quadriceps boot for hip and knee motion and a bar and weights for shoulder and elbow motion have been found most useful. Sandbags or saddle bags with weights could of course be employed especially for spine hyperextension. We have used the table extensively for side-lying exercises, although for abductor strengthening it possesses no great advantages over the conventional plinth. It has been found, however, that progressive tensor fascia lata stretching over the midsection break, or lateral spinal curvature stretching in a similar fashion is facilitated. When the patient is supine, adjustment of the table top levels allows stretching of tight hip flexors and of tight pectorals.

Exercises to be given in the prone position specifically and used for the various segments of the body are as follows:

I. With arm section completely lowered,
   a. Shoulder and shoulder girdle exercises may be done:
      1. Pendulum swing for flexion, forward elevation, extension, hyperextension, horizontal flexion — adduction, horizontal extension — abduction and circumduction.
      2. Abduction and sideward elevation.
      3. Adduction and sideward depression.
      4. Inward and outward rotation.
   b. The following spine exercises may be done and are often combined with arm motions.
      1. Neck extension, rotation, and lateral flexion.
      2. Thoracic spine extension.

II. With arm section only partially lowered, it presents a fixed point on which the hands may be placed:
   a. Hyperextension of wrists (flexor stretching).
   b. Hyperextension of the wrist with elbow extension, scapular adduction and thoracic spine extension.

III. With arm section at same level as central section:
   Elbow extension (width of table allows forearm to be pendant with humerus fixed).

IV. With leg section lowered (this may vary from a few inches to two feet):
   a. Hip extension.
   b. Hip abduction and adduction.
   c. Hip rotation, inward and outward.
   d. Hip circumduction.
   e. Lateral tilt of pelvis.

V. Side-lying exercises with leg section partially lowered:
   a. Tensor fascia lata stretching.
   b. Hip abduction against gravity from adducted position.
   c. Hip flexion and extension.
   d. Hip and knee flexion and extension.

It has occasionally seemed worthwhile to note, for the psychological effect on the patient, increases in the range of motion in a joint. This can be done by using a goniometer, a tape measure, or simply by making pencil marks on the table top. The table lends itself to this type of thing as it is easy to reproduce day after day standard conditions under which the measurements are taken.

DISCUSSION

The prone position presents certain obvious mechanical advantages in the performance of certain exercises and this paper describes the construction and use of a mechanical device whereby the physical therapist can more readily

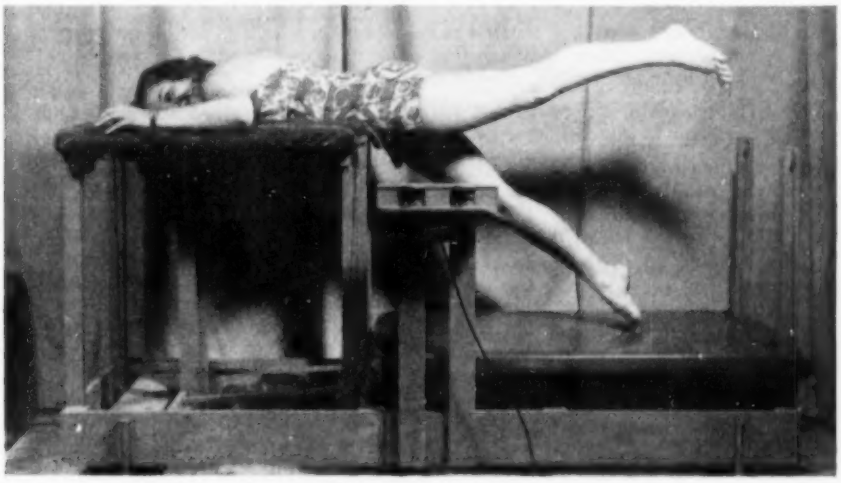

Figure 4. Adjustment of table for leg exercises.

make use of these advantages. In practice we have found that many of the procedures usually carried out in the Hubbard tank can be performed with the table we have described. As a result there is considerable saving in time and effort since the table can be easily taken on to a hospital ward. As mentioned above, we have observed that in certain patients movements of the extremities, in which the mechanical factor is not important, can be more easily executed when the patient lies face down. The reason is not clearly understood. It has been proposed that righting reflexes and postural reflexes play a part in this phenomenon, a concept which is supported by certain other observations. In the decerebrate ape rigidity in the upper extremities is most commonly displayed by the muscles of the flexor groups, and the characteristic attitude of the limb with the animal in the upright position is one of flexion. However, if the animal is placed in the quadrupedal position, the extensors also become hypertonic and the attitude assumed is like that of decerebrate rigidity in lower animals (Best and Taylor). Similar findings can occasionally be demonstrated in patients with hemiplegia. Twitchell, working in Denny-Brown's clinic, described in detail the process of recovery from hemiplegia and noted that at certain stages the position of the patient had a marked effect on the mobility of the afflicted limb. The connection of this data with the arthritides is tenuous and at the moment can only be placed in the category of clinical impression. We hope that with experience will come further observations on this interesting hypothetical relationship between position of the body and motions of the extremities.

SUMMARY

Herein is described the construction and use of a physical therapy table by means of which, with the patient in the prone position, a full range of motion of the extremities may be obtained.

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Address Changes and Undelivered Reviews

Due to new postal regulations undelivered *Reviews* will not be returned to the National Office, although the Association must continue to pay two cents for each notification of nondelivery.

This makes it imperative that address changes be received at least four weeks prior to the date of delivery to the new address.

In the past, the *Review* has tried to accommodate its readers by replacing undelivered copies. This was possible because some of the unclaimed journals were returned by the post office on payment of extra postage. Since this policy has been discontinued, *Review* readers are asked to cooperate by sending address changes *at once* so that the journals will reach them promptly.

Suggestions from the Field

Report of Functional Examination

Elizabeth R. Perry, A.B.

Introduction:

This study was made at the out-patient treatment center of the Crippled Children's Society in Miami, Florida. It is not intended to be a comprehensive study in any sense but was done merely as an attempt to evaluate the findings on this particular group of patients.

Purpose:

We were attempting to find a basic method of evaluating cerebral palsy patients at six months and yearly intervals in the Physical Therapy Department. The Occupational Therapy Department had used an Activities of Daily Living Test which they compiled and found very satisfactory. The Physical Therapy Department felt that if a test of functional physical abilities could be compiled and used in conjunction with the Activities of Daily Living test, a better evaluation of the patient's abilities could be obtained.

Functional Examination:

This test was made by taking the basic developmental physical activities such as rolling, crawling, kneeling, and hand-knee standing, and listing them with their component parts in approximate order of complexity and neurological development required. It does not include dressing or adjustment of clothing because it was felt that these activities belong in the Occupational Therapy Department's testing records rather than in Physical Therapy. Some complex motor activities are included such as getting in and out of an automobile and boarding a bus.

The test was mimeographed on standard white 8½" by 11" paper. It was printed lengthwise of the sheet to conserve space and to allow more test recordings to be placed on the same sheet. The backs of the pages are blank and can be used for notes or remarks as indicated.

On the face sheet of the test pertinent information is recorded such as the child's name, age, sex, diagnosis, date of test and the name of the therapist giving the test. Also included in this information is a description of the type of braces and shoes worn, and grading key. At the bottom of the page re-test dates can be written in with the name of the therapist giving the re-test.

Methods of Testing:

Tests were done in the Physical Therapy Department as the children came in for treatment. A special time was not set aside for this testing. The average time required was approximately 45 minutes or one and one-half treatment periods. Where it was impossible to secure the child's co-operation a longer testing time was required with two therapists, one working and the other recording the findings.

The test was explained to the patient before it was begun and the children were very much interested in it. In cases where the patient was too young for such explanation, the parents were familiarized with the test.

Equipment Needed for Testing:

Within department:
- Large mat
- Treatment table
- Walking area at least 20 feet long.
- Chairs of assorted sizes, some with arms and some without.
- Gait stairs.

Outside of department:
- Bathroom
- Ramp
- Bus
- Automobile

STATISTICS FROM FUNCTIONAL EXAMINATIONS

TOTAL NUMBER OF CASES TESTED	40
Number of males tested	24
Number of females tested	16
DIAGNOSIS	40 cerebral palsy
Rigidity	1
Tremor	1
Athetosis	9
Spasticity	29
Hemiplegia	15
Paraplegia	2
Triplegia	3
Quadriplegia	9
AGE RANGE OF CASES TESTED	17 years
Youngest patient tested	1 year
Oldest patient tested	18 years
AVERAGE AGE OF CASES TESTED	7.4 years
LENGTH OF TIME UNDER TREATMENT AT THE CRIPPLED CHILDREN'S SOCIETY	
Least time under treatment	1 month
Greatest time under treatment	41 months
AVERAGE TIME UNDER TREATMENT AT THE CRIPPLED CHILDREN'S SOCIETY	19.4 months

Physical Therapist, Crippled Children's Society, Miami, Florida.

STATISTICS FROM FUNCTIONAL EXAMINATIONS:

	GOOD	FAIR	POOR	ZERO
ROLL	39	1	0	1
CRAWL	30	1	4	5
KNEEL	26	3	6	8
STANDING BALANCE	21	4	5	10
WALKING				YES 29
				NO 11

CONCLUSION AND SUMMARY:

It was concluded from the study that this is a satisfactory method for evaluating cerebral palsy patients' functional physical abilities.

Considering the existing shortage of qualified physical therapists it was felt that this test is satisfactory for the following reasons:

1. Minimum time required
2. Ease of administration
3. Little special equipment required
4. Test may be used for patient motivation.

This test will be kept as part of the patient's clinical record and repeat tests will be made at six months and yearly intervals.

As testing reveals the necessity, the examination will be revised and adjusted to make it even more effective as a recording and evaluating device.

It was the general feeling that this test when used in conjunction with other testing methods, such as Activities of Daily Living, phonetic evaluation, psychometrics and psychologicals, will aid in patient evaluation.

Testing will be continued in view of the above findings.

NAME: AGE: SEX:

DIAGNOSIS:

BRACES & EQUIPMENT:

SHOES:

PUBLIC SCHOOL SPECIAL SCHOOL OUT PATIENT

GRADE SYMBOL KEY

N—No apparent involvement
G—Performs activity in spite of involvement
F—Performs activity slowly and inaccurately
P—Partial performance
O—Unable to perform activity

SPECIAL MARKS

B—With braces
NB—Without braces
TY—Too young to perform activity
NT—Not tested

TEST CONDITIONS: Full co-operation Partial Co-operation Observation

ORIGINAL TEST DATE: THERAPIST

RETEST DATE

ROLLING:

A. Back to stomach
   1. Left to right
   2. Right to left
B. Stomach to back
   1. Left to right
   2. Right to left
C. On hard surface (Floor or mat)
D. On soft surface (Bed)

CRAWLING

A. Get on hands and knees
   1. Assisted
   2. Unassisted
B. Maintain balance on hands and knees
C. Crawl
   1. Assisted
   2. Unassisted
   3. Reciprocal motion
   4. Other pattern (Describe)

KNEELING

A. Get into kneeling position
   1. Assisted
   2. Unassisted
B. Maintain kneeling position (10 secs.)
   1. Resists attempts to throw off balance
      a. Antero-posterior
      b. Lateral
C. Knee walking
   1. Forward
   2. Backward
   3. Sideward

RISE FROM LYING TO SITTING POSITION

A. Own method
B. With arms
C. Without using arms

SITTING

A. On flat surface with knees bent
   1. Using arms
   2. Without using arms
   3. Indian or tailor fashion
B. On flat surface with legs straight
   1. With arms
   2. Without arms
C. Sit down on chair from standing
   1. Assisted
   2. Without assistance
   3. Pattern or method

RISE TO STANDING

A. From bed or table
B. From sitting
   1. In correct chair
      a. Chair with arms
      b. Chair without arms
   2. From too high chair
   3. From too low chair
   4. From floor (Describe)
   5. From wheel chair

STANDING BALANCE

A. With support (Describe)
B. Without support (Time)
   1. With feet apart
   2. Feet together
   3. Arms at sides
   4. Holds balance against force
      a. Antero-posterior
      b. Lateral
C. Standing posture

GAIT

A. With assistance
   1. With human support
      a. Bilaterally
      b. Unilateral (which)
      c. Posterior
      d. Anterior
      e. Fingertip
   2. Inanimate support
      a. Parallel bars
      b. Furniture
      c. Crutches
      d. Canes
      e. Other support (Describe)
B. Description of gait
   1. Speed
      a. Fast
      b. Slow
   2. Body alignment
   3. Foot placement
   4. Stability
      a. Antero-posterior
      b. Lateral
   5. Confidence
   6. Position of head
   7. Position of arms
   8. Pelvic tilt
   9. Lordosis
   10. Back knee
   11. Coordination of arms and legs
   12. Weight distribution
C. Functional walking activities
   1. Up ramp
   2. Down ramp
   3. Up curb
   4. Down curb
   5. Up steps (Describe method)
   6. Down steps (Describe method)
   7. Turn
   8. Backward
   9. Sideward
   10. Halt when ordered
   11. On rough surface
   12. Pick up object from floor
D. Walking pattern
   1. Without shoes
   2. With shoes
   3. With braces and shoes
E. Balance
   1. Right leg (How long?)
   2. Left leg (How long?)
   3. Hop, right
   4. Hop, left
   5. Jump, flat surface
   6. Jump from height

CONTROL OF ARMS

A. Relax arms while sitting
B. Relax arms while standing
C. Relax arms while speaking
D. Extend elbow
   1. Right
   2. Left
E. Flex elbow
   1. Right
   2. Left
F. Flex fingers
   1. Right
   2. Left
G. Extend fingers
   1. Right
   2. Left
H. Extend wrist
   1. Right
   2. Left
I. Extend thumb
   1. Right
   2. Left

J. Oppose thumb
   1. Right
   2. Left
K. Left body weight on hands
   1. Sitting
   2. Standing
   3. Prone (Push-up)

MISCELLANEOUS COMPLEX ACTIVITIES

A. Toilet needs
   1. Get on and off toilet from chair
   2. Get on and off toilet from standing
B. Get into an automobile
   1. With assistance
   2. Without assistance
C. Get out of an automobile
   1. With assistance
   2. Without assistance
D. Get on and off a bus
E. Put on braces
F. Take off braces
G. Lock and unlock braces

Meet Our New Contributors

Joel C. Goldthwaite, M.D., Junior Visiting Physician, Robert B. Brigham Hospital, Boston, Massachusetts, received his medical degree from Harvard Medical School in 1943.

Dr. Goldthwaite was formerly Assistant in Medicine, at Peter Bent Brigham Hospital. Among his professional affiliations are the Massachusetts Medical Society, the American Rheumatism Association, and the New England Rheumatism Society.

Wilbur R. Gregory attended Western Michigan College of Education and later was awarded the degree of Bachelor of Science in Physical Therapy from Washington University, St. Louis, Missouri.

Since graduation Mr. Gregory has been employed by the Physicians' Physical Therapy Service, Portland, Oregon, under the direction of Arthur C. Jones, M.D.

Mr. Gregory is a member of the American Physical Therapy Association and the American Registry of Physical Therapists.

Dorothy Knight, Occupational Therapist, Essex County Cerebral Palsy Center, Newark, New Jersey, received her occupational therapy preparation at the University of Southern California, and the following year studied at the University of Washington. She received her B.A. degree from Eastern Washington College of Education, and in 1952 enrolled at Columbia University for postgraduate courses in cerebral palsy.

Miss Knight was Industrial Analyst for the Blind, Spokane Air Depot; Rehabilitation Director, Edgecliff Tuberculosis Sanatorium, Spokane; and Occupational Therapist for the Spokane Cerebral Palsy School before joining the staff of the Cerebral Palsy League of Essex County, New Jersey.

Her hobbies are painting and sculpture. The interview with Mrs. Mossige was prepared while Miss Knight was studying on a scholarship awarded by the Elks' National Foundation.

Ruth M. Lieber, Chief Physical Therapist, Robert B. Brigham Hospital, Boston, Massachusetts, received her physical therapy certificate from Bouve-Boston, and later was Clinical Supervisor, Bouve-Boston School and Sargent College.

Before accepting the position at the Robert B. Brigham Hospital, Miss Lieber was Posture Consultant at Brearley School, New York City. She is a member of the American Physical Therapy Association.

Hanne Mossige, Supervisor, Children's Clinic, State Hospital, Oslo, Norway, is a member of Norske Sykegymnasters Landsforbund. Mrs. Mossige spent six months in the United States on a fellowship for further study of cerebral palsy. The paper which is presented in the *Review* was prepared from a lecture given by Mrs. Mossige to a group of physical and occupational therapists attending the course offered by the Coordinating Council of Cerebral Palsy of New York. It was felt that the description of the work and the philosophy expressed would be of interest to physical therapists here. Mrs. Mossige, in a personal communication to Miss Elson, wrote that the lecture had not been intended for publication and asked that it not be printed. She felt that since her visit to the United States there might be changes in some of the treatment procedures. We felt, however, there will be no change in the warmth and understanding which is inherent in the program and therefore took the liberty of publishing it.

Elizabeth R. Perry, Physical Therapist, Crippled Children's Society, Miami, is a graduate of Butler University, Indianapolis, where she received her A.B. degree in 1943. Upon graduation, she entered Harvard University Medical School and in 1944 was awarded the Certificate of Completion in physical therapy.

Mrs. Perry was physical therapist at the Veterans Administration Hospital in Fort Harrison, Indiana, and Supervisor of Physical Therapy at the Indianapolis General Hospital. She is a member of the American Physical Therapy Association and the American Registry of Physical Therapy.

Dorothy E. Voss, Assistant Head Physical Therapist, Kabat-Kaiser Institute, Vallejo, California holds the degree of Bachelor of Education from Western State College of Macomb, Illinois, and took postgraduate studies in physical education at the University of Wisconsin.

She completed requirements for her physical therapy certificate at Harvard Medical School.

Following graduation, Miss Voss did research on "Growth Problems in Anterior Poliomyelitis" at Children's Hospital, Boston, and was staff physical therapist at Massachusetts General Hospital. She was Chief Physical Therapist at George Washington Hospital, Washington, D.C., before joining the staff of the Kabat-Kaiser Institute.

Miss Voss is Secretary of the American Physical Therapy Association.

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Our Book Reviewers for October

J. Leonard Goldner, M.D., Assistant Professor Orthopaedic Surgery, Duke University School of Medicine, Durham, N. C.

Ruth E. Jack, Lecturer, Workshop on Poliomyelitis, Department of Physical Therapy, University of Southern California; Physical Therapy Coordinator, Rancho Los Amigos Respiratory Center, Home Care Department.

Oscar O. Selke, Jr., M.D., Director of Physical Medicine and Rehabilitation, Hermann Hospital, Houston, Texas.

Lt. Col. C. D. Shields, M.C., Chief Physical Medicine Consultant, Department of the Army, Office of the Surgeon General, Washington, D. C.

William J. Shriber, M.D., Director of Physical Medicine, Beth Israel Hospital, Boston; Assistant in Medicine and Physical Medicine, Massachusetts General Hospital, Boston; Assistant Director, Bay State Medical Rehabilitation Center, Boston.

Catharine Warren, Chief Physical Therapist, Peter Bent Brigham Hospital, Boston, Mass.

Editorials

DURING the next few months one of our Association's most important committees will be busily at work on a project which is of primary concern to every physical therapist. This group is the Committee on Nominations which has the responsibility for selecting and presenting to you persons capable of assuming the duties of national officers. It is obviously a difficult undertaking and one which requires objective thinking and keen foresight to insure success.

As one means of expediting this task, this committee will call upon every chapter to assist in the initial selection of possible candidates by suggesting names of persons qualified for office. It is this opportunity which holds for every one of us the greatest responsibility and which necessitates our careful consideration of the manner in which we meet this task.

It is unfortunate but true that in too many chapters the suggestions for nominees become a popularity contest rather than an expression of sincere and thoughtful selection. Too few of us, when we present a name, take the time to first consider the requirements of the job for which we are selecting the person. The positions held by our national officers are not similar and neither are they of an honorary nature. They require certain characteristics and abilities and in order to make a sound selection of candidates these must be taken into consideration. In this respect it is suggested that each of us, prior to the chapter meeting, read and read carefully Article V of the Bylaws in which are stated the qualifications and duties of the officers. With these points clearly in mind, a reliable and efficient nomination will naturally result.

One other tendency relative to candidate selection also is somewhat apparent in our Association and is one which reflects inconclusive and hasty thinking. We refer to the pattern of suggesting many of the same people year after year to fill offices. Now we are not recommending that every election should produce a complete new population in our executive group. This would result only in confusion and retardation of progress since a balance of experience and originality is a basic requisite. However, the trend of submitting the same name does place an undue burden on the Committee on Nominations and fails to promote interested new persons who may have much to contribute.

When you are called upon to assist in the selection of nominees, consider carefully the many possibilities among your chapter officers and committee chairmen who have, by virtue of their work, shown promise of one sort or another to successfully perform certain jobs. Above all, be objective in your thinking; weigh the person's ability against the requirements of the office. Consider also the possibilities presented by the national committee members with whom many of you have worked and who have the advantage of experience on a national level.

Finally, keep constantly before you the fact that although it is the duty of the Committee on Nominations to select the slate, you have a large responsibility in suggesting candidates who will best represent you in determining the policies of your Association and profession.

Give the United Way!

Association Activities

Marriages

Martha Hadeland of Los Altos, Calif., to A. Travor Turnbull, Sacramento, Calif.
Pauline Wilcox of Pueblo, Colo., now Mrs. Pauline W. Hayden, Pueblo, Colo.
Judith E. Johnston of Parks AFB, Pleasanton, Calif., to Lt. James R. White, Parks AFB, Calif.
Helen J. Steele of Iowa City, Iowa, to Thomas L. Jones, Jr., Cleveland, Ohio
Lucia Osgood of Penacook, N. H., to Edward Ryan, Penacook, N. H.
Helen Martin of Seattle, Wash., to Leonard Tall, Seattle, Wash.
Phyllis M. Johnson of Ann Arbor, Mich., now Mrs. Phyllis J. Samore, Ann Arbor, Mich.
Frances Lewis of Macon, Ga., now Mrs. Frances L. Schultz, Corpus Christi, Texas
Lois Phenicie of Eugene, Ore., now Mrs. Lois P. Radomske, Eugene, Ore.
Zetta Potter of Seattle, Wash., now Mrs. Zetta P. Lockwood, Seattle, Wash.
Bernice June Cleveland of Los Angeles, Calif., now Mrs. Bernice C. Jensen, Hollydale, Calif.
Nora Hoel of Minneapolis, Minn., to Laurence J. Breyen, Minneapolis, Minn.
Margery Bradley of Vilas, N. C., to Donald D. Coler, Long Beach, Calif.
June Stallmann of Holyoke, Mass., to Robert Tacy, Champaign, Ill.
Paula Eldridge of Port Jefferson, L. I., N. Y., to Vincent Pascucci, Nantucket, Mass.

Change in 1954 Conference Date

It has been necessary to change the date previously announced for the 1954 Conference in Los Angeles in order to avoid sharing facilities with another large national convention with 20,000 attending.

The thirty-first annual conference of the American Physical Therapy Association will be held at the Hotel Statler, Los Angeles, the week of June 27, 1954.

Eleanor M. Kelly of Belmont, Mass., was killed in an automobile accident in Vero Beach, Florida, on July 6, 1953. Miss Kelly who was a graduate of Sargent was on the staff of the Leland School in Detroit for many years and had been a member of the American Physical Therapy Association since 1936.

Association Membership Expanded For Foreign Trained

At the annual meeting in Dallas in June, the Executive Committee approved a plan whereby qualified physical therapists trained in some foreign countries might become members of the American Physical Therapy Association. Requirements include: membership in a physical therapy association affiliated with the World Confederation for Physical Therapy; one year of supervised experience in this country; successful completion of an examination given by the American Physical Therapy Association.

Under this plan chapters and members will have added responsibilities to cooperate in assisting these colleagues to become part of our professional group.

The following detailed information has been printed in pamphlet form for those eligible or interested.

How to Become a Member

Informational data on membership requirements for members of physical therapy associations affiliated with the World Confederation for Physical Therapy who have entered, or are planning to enter, the United States on a permanent visa.

Eligibility Requirements

1. Graduation from a school of physical therapy approved by the physical therapy association of that country.
2. Membership in the physical therapy association in the country of training.
3. Letters of reference from the physical therapy society, former employers, and others which are satisfactory to the American Physical Therapy Association.

After Arrival in the United States

Upon completion of an application form with the above information, and payment of a service fee of five dollars, the National Office of the American Physical Therapy Association will give guidance to help the candidate fulfill the specific professional requirements of:

1. A minimum of one year of experience in a department satisfactory to, and approved by, the American Physical Therapy Association and under the supervision of a member of the Association.
2. Successful completion of an examination.

Only those whose work and personal references are satisfactory will be permitted to take the examination. The Association reserves the right to require an additional period of supervised experience before the examination can be taken.

Association Services to the Candidate

1. Help in finding approved employment.
2. Help in any professional or personal problems occurring during the probationary period. The candidate is encouraged to write to the National Office for any help or guidance which is needed.
3. Guidance on study in preparation for the examination.
4. Introduction of the candidate by letter to the president of the chapter in the area of employment in order that candidate may attend meetings and become acquainted with colleagues.

GENERAL

In the United States the individual state reserves the right to regulate the practice of physical therapy within its borders. Therefore, in some states those trained in other countries may not be eligible for employment under the laws of that state. It is not possible always to provide employment in a specific city or state due to these restrictions. The candidate for membership should bear this in mind and be willing to accept employment wherever it is advised. A good reading and speaking knowledge of English is essential. If this is at all limited, a longer period of supervised experience may be advised together with study of the language during that time.

MEMBER-ORGANIZATIONS OF THE WORLD CONFEDERATION FOR PHYSICAL THERAPY

Australia—The Federal Council of the Australian Physiotherapy Association
Canada—Canadian Physiotherapy Association
Denmark—Danske Fysioterapeuter
Finland—Suomen Laakintavoimistelijain Yhdistys
Great Britain—Chartered Society of Physiotherapy
New Zealand—New Zealand Society of Physiotherapists, Inc.
Norway—Norske Sykegymnasters Landsforbund
South Africa—South African Society of Physiotherapists
Sweden—Kvinnliga Legitimerade Sjukgymnasters Riksforbund
United States—American Physical Therapy Association
West Germany—Zentralverband der Krankengymnastischen Landesverbande in westerdeutschen Bundesgebiet

Mildred Elson Reelected President at London Meeting

Mildred Elson, Executive Director of the American Physical Therapy Association, was reelected president of the World Confederation for Physical Therapy at the first International Congress of that group which concluded its week-long session in London on September 8.

Miss Elson summed up the feeling of the 1,350 registered delegates to the Congress when she said at the closing dinner, "The knowledge, good fellowship, and understanding which we have gained through the lectures, demonstrations, trade exhibitions, and social events which have made up this Congress will be carried by the 370 overseas visitors from 25 countries to the far corners of the earth. Patients in India, South Africa, Europe, North and South America, Australia, and New Zealand will benefit from what has been said and done here. The well-being which will spread from this Congress to the four corners of the earth cannot be measured."

Forty Americans attended the meetings. Two members of the American Physical Therapy Association participated in the program. Dr. Catherine Worthingham presented a paper on "The Trends of Education for Physical Therapists" and Margaret Knott demonstrated some of the rehabilitation technics in use at the Kabat-Kaiser Institutes, in conjunction with a presentation made by Dr. Herman Kabat, co-founder of the Institutes.

In addition to the lectures and the scientific presentations, the Congress was marked by a number of outstanding social functions. The high point was the reception by the Lord Mayor of London at Guild Hall. The British Medical Association, the Apothecaries Association, and the British Minister of Health also received the delegates.

American delegates were deeply impressed by the hospitality of the Chartered Society of Physiotherapy of Great Britain, and by the exceptionally efficient manner in which all arrangements were carried out. All meetings were well attended, and ample opportunity was provided for an exchange of ideas both in and out of meetings. Favorite topics of discussion in "rump sessions" were opportunities for advanced study in other countries, reciprocity, and standards of education for physical therapists.

(Note: A fuller account of the proceedings of the Congress will appear in the November issue of the *Review*.)

D. T. Watson School of Physiatrics

The Division of Physical Therapy of the D. T. Watson School of Physiatrics owes its name, as well as its home, to David Thompson Watson. Mr. Watson was the famous Pittsburgh attorney who represented the United States in the settlement of the Alaskan Boundary dispute. Despite a busy law practice, Mr. Watson maintained a lively interest in crippled children throughout his lifetime and furnished the best care possible for many who were brought to his attention. Upon his death he bequeathed his estate to his wife Margaret Hepburn Walker Watson. This was done with the understanding that she would leave her estate, including their country home, for founding a home for crippled children. It was his express wish that the best and most up-to-date medical care always be given to the patients, yet at the same time he wished to preserve a little of the graciousness of the living habits of the early 20th century. Typical of this was his request to have the greenhouse maintained so that fresh flowers would always be available for the children. The Board of Trustees, some of them still friends and business associates of Mr. Watson, have tried very hard to maintain this Watson standard.

It was in line with the policy of modern medical care that the first physical therapist was employed when the Home for Crippled Children was opened in 1920. The late Dr. David Silver, then Chief of Staff, became acquainted with physical therapy during World War I and recognized the importance of this infant field. At his suggestion, the first physical therapy student was admitted in 1920; however, no formal course organization was made until 1927 when the school became affiliated with The University of Pittsburgh School of Medicine — an affiliation that has been continued. In those days life could be a little more leisurely and a two-year physical therapy course open only to college graduates was established. So that individual instruction could be given to each student, only four students were admitted each year. This pattern of education continued until 1942. Then with World War II came an acceleration of all education and D. T. Watson put aside the two-year course to assist in the Woman's Army Specialized Training Program. A new pattern was thus established and the present one-year certificate course was started. A degree program with the College of the University of Pittsburgh was initiated in 1938 to satisfy the growing need of students to complete a program in four years.

When the Council on Medical Education and Hospitals of the American Medical Association surveyed the physical therapy schools of the country and published its first approved list in 1936, D. T. Watson School was on the list. It also had a place on the original list of approved schools of the Commonwealth of Pennsylvania and, although a pioneer among physical therapy schools, D. T. Watson has kept pace with modern educational trends.

The School of Physical Therapy is located on the Watson country estate, Sunny Hill, about 15 miles west of Pittsburgh, Pennsylvania. Seventy acres of landscaped grounds and seventy acres of farm land comprise the estate. The rolling lawns,

the beautiful gardens and the gracious Watson home are memories for D. T. Watson students everywhere. The forty-room Watson residence is now the school building. The billiard room has become the classroom, where anatomical models rest in Chippendale cabinets and a famous painting of Moses has been preserved because it shows muscles so well. Mr. Watson's law library is now well stocked with medical books; and the Japanese card room and the breakfast room, with its wonderful old panelling and Dutch tile fireplace, are study rooms. The formal dining room, Mrs. Watson's bedroom, and a former guest room serve as women's dormitories; and Mr. Watson's office is now a physical therapy school office. In the basement of the building is the dissection room where students spend hours learning anatomy. Throughout the building scientific progress and gracious living intermingle to give an atmosphere conducive to even the most difficult learning.

On the same grounds and connected by a tunnel with the school building is the one hundred-bed D. T. Watson Hospital School for Crippled Children. School laboratory space is in the large auditorium of this building and a close cooperation is maintained between the school and the hospital. Patients with many types of disability may be demonstrated in the classroom and are available for laboratory classes.

Some classes of the school are held in the Medical School of The University of Pittsburgh and at the Medical Center, but most of the students' time from October until mid June is spent at the Watson Estate.

In mid June the class scatters to the various clinical practice facilities in the Pittsburgh area for well rounded clinical experience. The physical therapy departments of the hospitals of the Medical Center, St. Francis Hospital and the Veterans Administration Hospital at Aspinwall allow students to see and treat practically every kind of disease and disability usually seen in a physical therapy department. Selected clinics are nearby for student visits.

The original School of Physical Therapy has grown into a School of Physiatrics where courses are given for physicians, graduate physical therapists, and nurses.

An account of the school would be incomplete without special recognition of the role that Dr. Jessie Wright has played in guiding and expanding the School. And high tribute must also go to Miss Lucile Cochran, the Administrator of the School, who has carried on so well what we like to call the Watson tradition. Although Mr. Watson probably visualized the best medical care for a local situation, he would be most proud to see the graduates of the school that he endowed caring for handicapped people throughout the world.

Recipe—For A Good Staff Physical Therapist

Elizabeth C. Addoms

To achieve the status of a good staff Physical Therapist will be your immediate objective on completion of your basic professional education at New York University. What makes a good staff therapist? The question will be answered in a different way by everyone who ponders it; and so I give you my own ideas, to be supplemented by your thoughts and those of others whose opinion you may ask.

The essential ingredients of a good staff Physical Therapist seem to me to be competence, kindness, imagination, self respect, and loyalty. You say that those are characteristics of any adequate person whose work touches closely the lives of people and I agree. You suggest that we get down to something more tangible, more concrete. *Suppose we try.*

A good staff therapist knows his job. He is acquainted with the physiologic and psychologic rationale underlying the application of techniques used in his profession, and is skillful in the administration of those techniques. Always ready to learn from others, he still possesses calm confidence. He functions well, even under pressure. *Competence.*

A good staff therapist evidences in countless ways a sympathetic understanding of his patients and their unique problems. He bends every effort toward the total welfare and happiness of his charges. He is generous in extending credit to

Reprinted from *The Violet Ray*, yearbook of the New York University Physical Therapy Class of 1953.

his associates when commendation has been fairly earned by them. *Kindness.*

A good staff therapist is resourceful. His performance is not circumscribed by the exact procedures taught and equipment used during the period of his student training. Without deteriorating into an unthinking disciple of any "system," he welcomes with enthusiasm new and better approaches to patient care. He invests, builds and experiments within strictly appropriate limits. A sense of humor will never permit him to take himself and his reactions too seriously, or to develop an attitude of self pity when the going is rough. He recognizes and honors the individual personalities of all with whom he has contact, whatever their relationship to him may be. *Imagination.*

A good staff therapist conducts himself with pleasing dignity. High quality is the stamp of his professional appearance, manners, standards and ethics. While refusing to accept undeserved praise, he derives soul satisfaction from hard work well done. *Self respect.*

A good staff therapist protects and supports his profession. He guards its reputation in the medical field and in the larger community. He is anxious to contribute a reasonable amount of his time, strength, intelligence and money to further the worthy objectives of his professional organization, on both local and national levels. He deems it a privilege, as experience is gained, to assist in the clinical training of Physical Therapy students. Without waiting to be asked, he offers a helping hand where it is needed. *Loyalty.*

A good staff therapist operates best on a rehabilitation team. He understands and appreciates the contribution of other players on the team, both inside and outside of his own department, institution or agency. He will never covet the role of Pooh-Bah or Lord High Executioner. He has faith in the team and behaves accordingly. *Competence, kindness, imagination, self respect and loyalty.*

If mixed in the proper proportions and heated well over the fire of experience, the above named ingredients of a good staff Physical Therapist may be expected to evolve into able *leadership,* without which no profession can meet its' responsibilities, and develop its' full potentialities.

New Student Members

Boute-Boston

Cynthia Y. Clair

Brooke Army Medical Center

Lt. Barbara G. Brownell
Lt. Jean L. Eastep
Lt. Ann D. Fritsch
Lt. Joan M. Graziano
Lt. Rita T. Gregory
Lt. Minnie J. Jones
Lt. Winnie W. Luzon
Lt. Elsie R. Martyn
Lt. Jean M. Meyer
Lt. Frances L. Mitchell
Lt. Catherine J. Probst
Lt. Shirley A. Schelper
Lt. Barbara A. Smith
Lt. Gertrude A. Stork

Chapter News

Greater New York District

"Honestly, I don't remember when I've had a better time," was the cry heard on the bus returning from Talman Mountain Park, Nyack, New York.

Lobster, sun, and fun were the topics of conversation. The purpose of the Lobster Bat held by the Greater New York District, New York Chapter of the American Physical Therapy Association, was to raise money for the World Confederation for Physical Therapists. The one hundred dollar donation speaks for the success of the Bat.

Races, soft ball, good food, and much chatter among the Confederation friends ended all too soon.

Our warmest wishes for a successful World Confederation congress in London in September.

ALICE SELIGMAN
New York District
Program Chairman

Louisiana Chapter

The Louisiana Chapter became the 27th to send a contribution for the World Confederation For Physical Therapy.

It was with a great deal of pride that we were able to transmit a draft for $1,050.00 from the American Physical Therapy Association.

North Carolina Registration Examination

An examination for registration under the North Carolina Physical Therapy Practice Act will be given in Gastonia, North Carolina, on Friday, October 30, 1953. Application forms and further information may be obtained from Maria M. Kennedy, Secretary, The State Examining Committee of Physical Therapists, 123 West Seventh Street, Charlotte, N. C.

Members — Please see Notice on page 544.

Schools of Physical Therapy

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS
OF THE AMERICAN MEDICAL ASSOCIATION

Graduates of these schools are eligible for membership in the American Physical Therapy Association.

California

School of Physical Therapy
Childrens Hospital Society
4614 Sunset Blvd., Los Angeles 27
(Univ. of California, Los Angeles)

School of Physical Therapy
College of Medical Evangelists
White Memorial Hospital
Boyle & Michigan Aves.
Los Angeles 33

Department of Physical Therapy
University of Southern California
University Park
Los Angeles 7

Curriculum in Physical Therapy
School of Medicine
University of California
3rd & Parnassus
San Francisco 22

Division of Physical Therapy
Stanford University
Stanford

Colorado

School of Physical Therapy
Department of Medicine
University of Colorado
4200 East Ninth Ave.
Denver 7

Connecticut

School of Physical Therapy
University of Connecticut
Box U 101
Storrs

Illinois

†*School of Physical Therapy
The Medical School, Northwestern University
303 East Chicago Ave.
Chicago 11

Iowa

†Department of Physical Therapy
State University of Iowa
*University Hospitals
Iowa City

Kansas

School of Physical Therapy
University of Kansas — Medical Center
Kansas City 3

Louisiana

†Charity Hospital School of Physical Therapy
1532 Tulane Ave.
New Orleans

Massachusetts

*Course in Physical Therapy
Bouve-Boston School
Medford 55
(Tufts College, Medford)

*Program in Physical Therapy
Simmons College
Children's Medical Center
300 Longwood Ave.
Boston 15

*Department of Physical Therapy
Boston University
Sargent College of Physical Education
6 Everett St.
Cambridge 38

Michigan

Curriculum in Physical Therapy
Dept. of Physical Medicine & Rehabilitation
University Hospital
University of Michigan
1313 East Ann St.
Ann Arbor

Minnesota

Course in Physical Medicine
The Medical School
University of Minnesota
Minneapolis 14

†School of Physical Therapy
Mayo Clinic
Rochester

Missouri

Department of Physical Therapy
Division of Auxiliary Medical Services
School of Medicine
Washington University
Barnes Hospital
600 S. Kingshighway
St. Louis 10

Division of Health & Hospital Services
St. Louis University School of Nursing
1402 South Grand Blvd.
St. Louis 4

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* Only women accepted
† Only certificate awarded.

New York

*Physical Therapy School
Albany Hospital
New Scotland Ave.
Albany 1
(Russell Sage College, Troy)

Program in Physical Therapy
University of Buffalo
2183 Main St.
Buffalo 14

Division of Physical Therapy
College of Physicians & Surgeons
Columbia University
630 W. 168th St.
New York 32

Curriculum in Physical Therapy
School of Education
New York University
Washington Square
New York 3

North Carolina

†Division of Physical Therapy
School of Medicine
Duke University
Durham

Ohio

School of Physical Therapy
The Frank E. Bunts Educational Institute
Euclid & East 93rd St.
Cleveland 6
(Cleveland Clinic)

Pennsylvania

†The D. T. Watson School of Physiatrics
Leetsdale

Division of Physical Therapy
School of Auxiliary Medical Services
University of Pennsylvania
1818 Lombard St.
Philadelphia 46

Texas

†Grady Vaughn School of Physical Therapy
Baylor University Hospital
Dallas 1

†School of Physical Therapy
Hermann Hospital
Houston 5

School of Physical Therapy
The University of Texas — Medical Branch
Galveston

Virginia

Physical Therapy School
Baruch Center of Phys. Med. & Rehabilitation
Medical College of Virginia
Richmond 19
(Richmond Professional Institute)

Wisconsin

Section in Physical Medicine
Medical School
University of Wisconsin
Madison

U. S. Army Medical Service

†* Physical Therapy Course

Medical Field Service School
Brooke Army Medical Center
Fort Sam Houston, Texas and
Brooke, Letterman, and Walter
Reed Army Hospitals

Write to: The Surgeon General
Department of the Army
Washington 25, D. C.
Attention: Personnel Division

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* Only women accepted.
† Only certificate awarded.

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Abstracts

Correlation of Ballistocardiogram with Work Performance and Energy Cost for Guidance in Rehabilitation of Cardiac Patients

Henry Brown, Seymour H. Rinzler, and Joseph G. Benton, CIRCULATION, VII:740-746, May 1953.

The authors have been particularly interested in the problem of rehabilitation of cardiac patients and since definite knowledge of the functional capacity of such patients would be of value in guiding the course of rehabilitation, especially vocationally, the present study was undertaken with the following purposes: (1) to determine if any correlation existed between the ballistocardiogram at rest and the ability of a cardiac patient to do work or expend energy, and (2) if a correlation were found, to decide if it warranted the use of the resting ballistocardiogram as a simple, clinical source of information for guidance in planning rehabilitation programs for cardiac patients.

In 51 known cardiac patients of all etiologies and functional classification I through III, a comparison was made of the resting ballistocardiogram and the ability to do work and expend energy as determined by a series of step-walking tests of graded intensities, while oxygen consumption was measured in a closed system respirometer.

The results indicate that under the conditions studied, a normal resting ballistocardiogram in a known cardiac patient is very frequently associated with the capacity for moderate to marked energy expenditure. An abnormal resting ballistocardiogram gives no consistent information about the patient's work capacity. Statistical analysis of these correlations is highly significant.

Furthermore, the resting ballistocardiogram, when normal, appears to be a more accurate indicator of the functional classification of a cardiac patient than the assignment of a classification on the basis of the interpretation of the cardiac history and physical examination.

This suggests that the resting ballistocardiogram (a) may be a useful tool in evaluating the functional or work capacity of a cardiac patient for rehabilitation purposes and vocational guidance, and (b) may serve as a screening device for finding those cardiacs, other things being equal, who possess the functional capacity to perform jobs or activities whose energy requirements are known or can be estimated. However, in view of the relatively higher incidence of abnormal resting ballistocardiograms in persons in the older age groups, for practical purposes this usefulness of the ballistocardiogram may be limited to the cardiac patients under the age of 50 years.

Action of Muscular Work on Transfer of Sugars Across Cell Barriers; Comparison with Action of Insulin

M. S. Goldstein, V. Mullick, B. Huddlestun and Rachmiel Levine, AM. J. PHY., 173:212-216, May 1953.

It has been known clinically for many years that intense muscular work increases the uptake of sugar from the blood, even in the untreated diabetic patient. Because of the similarity of the action of work to that of insulin in respect to blood glucose, the authors were led to investigate whether, like insulin, it would effect the entry of sugars on the basis of chemical configuration irrespective of utilization.

Muscular work is known to increase the rate of uptake of glucose by tissues. In the eviscerated-nephrectomized animal, the tissues are unable to utilize various sugars including isomers of glucose. Under such experimental conditions, muscular work promotes cellular entry of some of these sugars despite the absence of utilization. This constitutes a phenomenon parallel to that proposed by this laboratory for the action of insulin, i.e., a primary action on facilitating transfer of certain sugars across cell surface barriers. Just as in the case of insulin, work promotes cellular entry of sugars possessing the same chemical configuration as *d*-glucose at *carbons* 1, 2 and 3. This action of muscular work is independent of insulin and is exhibited in the depancreatized preparation. Local muscular contraction acts to facilitate sugar entry into body water and appears to be operating by a humoral mechanism.

It is thus postulated that both insulin and a humoral product of contracting skeletal muscle can activate a transfer mechanism for certain types of sugars across cell surface barriers.

Metabolic Changes Associated with Operation

Ian W. MacPhee, BRITISH M. J., No. 4818:1023-1028, May 9, 1953.

Some evidence has been produced of increased 11-oxysteroid secretion and 17-ketosteroid excretion as a measure of increased adrenocortical activity after operation. This has often been shown in recent years in association with trauma, burns, acute medical conditions, and operation itself. The present study has shown that these changes are also associated with alterations in electrolyte and water balance. Changes of sodium, chloride, and water retention, associated with increased potassium excretion and with exchanges of sodium for potassium within the cells, are very similar to the effects of 11-deoxycorticosterone. Though they may be accounted for by other means, such as local accumulation of fluid and electrolyte in damaged tissues, the fact that they are associated with other evidence of adrenocortical activity suggests that they are themselves linked with such activity. Prunty has recognized a similar phase of decreased plasma sodium and chloride in acute porphyria. The study of eosinophil counts, uric acid excretion, and neutral reducing steroid excretion indicated an increased adrenal activity during the acute phase of the disease. As Selye has suggested, such a response may occur in a variety of conditions, all in themselves a reflection of injury to the organism.

The retention of sodium chloride and water in the body after operation, in amounts greater than apparent needs, has now become recognized. The diminished urinary excretion of chloride in the first weeks after operation vitiates the urinary chloride estimation as a measure of body chloride requirements. Attempts to replace the apparent chloride deficiency will only lead to water and salt overload. The author believes that plasma chloride estimations in the postoperative period are of greater value in estimating body chloride deficiency. Even

these determinations, however, will give a false low reading.

The importance of potassium in the serum and extra-cellular fluids has been recognized ever since the work of Ringer in 1883. In recent years great interest has been focused on the loss of potassium in various acute medical and surgical conditions. As shown by numerous workers, potassium can be lost to the body in gastro-intestinal disorders such as diarrhea, sprue, intestinal fistulae, prolonged vomiting, and in certain types of diet.

Tarail and Elkinton have demonstrated that in both normal and potassium-depleted patients the kidney has a limited minimal excretion of potassium, below which minimal level the excretion does not appear to fall. This continued potassium deficiency, they believe to be an important factor in producing further depletion. If, in addition to these other sources of potassium deficiency, the incident of a surgical operation increases the urinary potassium loss, cellular potassium depletion is further increased, and the production of a state of clinical potassium deficiency is hastened. The fact that the rapid mobilization of cellular potassium after an operation is often associated with a rise in serum potassium concentration makes the recognition of cellular depletion all the more difficult.

The Effect of Moderate and Hard Muscular Work on the Spatial Electrocardiogram

Noboru Kimura and Ernst Simonson, AM. HEART J., 45:676-682, May 1953.

1. In six normal young men the effect of three basic types of exercise (moderate aerobic: walking at 3 m.p.h., 5 per cent grade for 15 minutes; anaerobic: running at 8 m.p.h., horizontal, 3 minutes; severe aerobic: running at 6 m.p.h., horizontal, for 30 minutes) on spatial mean QRS and T vectors was investigated.

2. Characteristic differences were obtained in the three different types of exercise. In anaerobic work changes of the horizontal angle and the magnitude of the spatial QRS vector contrast with the absence of such changes in the other types of work.

3. Severe aerobic work is characterized by a large shift of the horizontal angle of the T vector to the right, increase of the spatial angle between the mean QRS and T vector, increase of the magnitude of the T vector, and depression of the S-T segment. These changes can be explained on the basis of left ventricular ischemia. The over-all changes in this type of work exceed those in the two other types of work.

4. It is suggested that the shift to the left of the mean T vector and its decrease in moderate aerobic work are due to adaptation, and the opposite changes in severe aerobic work are due to fatigue.

5. On the basis of the results obtained several suggestions for applications to exercise tests in clinical electrocardiography are made.

Studies in Peripheral Arterial Occlusive Disease

Stanford Wessler and M. J. Schlesinger, CIRCULATION, 7:641-655, May 1953.

The purpose of this investigation was to clarify the relationship of pathologic changes in the arteries and other tissues of the extremities to the clinical manifestations of arterial insufficiency. This report describes a method of arterial injection and dissection of human legs that were obtained after surgical amputation. Data is included relative to arterial narrowing, occlusion and calcification and their relation to interarterial anastomosis and gangrene.

The technic used for the study was based on the use of a radiopaque injection mass containing lead and gelatin and on a procedure for unrolling the extremity so that the major arteries lay in one plane. The extent and location of arterial occlusion, narrowing, calcification and interarterial anastomosis were studied in 66 legs amputated because of arteriosclerotic gangrene.

The findings indicated that one or more occlusions were found in each extremity examined; in 91 per cent of the legs two or more major arteries were occluded, usually at more than one point with an average of 11 sites of occlusion per leg. More than one-fourth of the lengths of these arteries were occluded by the time of amputation.

In these arteriosclerotic limbs, the three lower leg arteries were the principal cause for lack of flow from the aorta to the toes. The posterior tibial artery was the first artery to be occluded, and occlusions were more extensive here than in other arteries.

An extensive arterial collateral circulation was clearly demonstrated from the study. The rich anastomic circulation permitted the disease to become extensive before gangrene set in.

Warm-up Effect in Human Maze Learning

C. E. Hamilton and W. R. Mola, J. EXPER. PSYCHOL., 45:437-441, June 1953.

In an experiment designed to determine the possible effect of warming-up activity on the learning of a task different from those previously employed, three groups of 25 subjects learned a multiple-U finger-relief maze for 15 trials each.

One group, serving as a control, learned this maze without preceding practice; the other groups had one trial on each of five similar preliminary mazes, such practice being followed either immediately by work on the test maze for one group or 24 hours later, for the other.

Results showed no significant differences among the groups with respect to errors on the test maze. Both experimental groups were superior to the control with respect to time-per-trial scores but not significantly different from each other. It was concluded that the experiment does not afford evidence for warm-up effect in the learning of the finger-relief maze.

Kinesthetic Awareness in Motor Learning

F. A. Hellebrandt, CEREBRAL PALSY REV., 14:2-4, May-June 1953.

This article introduces the physical therapist to a widely scattered literature on the neurophysiology of motor learning. It presents two theories of motor learning. One underlies classical muscle reeducation and will be recognized by the physical therapist. The other, the Coghillian theory is especially interesting at this time because of the

increasing use of total patterns in muscle training.

The newer knowledge of the mechanism of proprioception is summarized. It is interesting to note that electrical stimulation was used for muscle training 50 years ago.

Many practical implications are presented for the physical therapist, and it should be studied in its entirety by all who have an interest in muscle training.

Self-Regulatory Behavior after Extirpation of Certain Endocrine Glands: A Review

Frank B. Strange, SCIENT. MONTHLY, LXXVI: 344-348, June 1953.

Much attention has been devoted in recent years to the self-regulatory functions of the body. The outstanding work of Cannon in this field is probably the most widely known. Whereas his studies have been primarily concerned with the physiological regulations of the internal environment, much of the work of Richter has dealt with the maintenance of the constancy of the internal environment through the operation of behavior regulators. Research pertaining to self-regulatory behavior in rats after extirpation of certain endocrine glands is reviewed. These mechanisms include: body temperature regulation, water balance, sodium concentration of the blood, calcium concentration of the blood and flow of insulin.

It is concluded that rats have a tendency toward and the ability to induce, in a permissive situation, behavior which will maintain the constancy of the internal environment. It is felt that this principle of the constancy of the internal environment may be of value in understanding activities of the total organism.

The Treatment of Burns by the Exposure Method

Curtis P. Artz, Eric Reiss, John H. Davis and William H. Amspacher, POST-GRAD. M. J., 13:535-546, June 1953.

The treatment of burns by the exposure method was first reported in the United States in 1887. Our interest in the exposure method was stimulated by the release of information revealing the overwhelming incidence of thermal burns in atomic warfare. Several thousand burn casualties might be expected after the explosion of an atomic bomb over any large city. The possibility of such a catastrophe requires simplification of methods of treatment. With these considerations in mind, a study of the practicability and effectiveness of the exposure method was undertaken. In the past three years approximately 250 burn patients at Brooke Army Hospital have been treated by the exposure method, and it has been found that this method is not only practicable in the event of catastrophe but also worthy of consideration in the treatment of burns during peacetime. The authors present numerous exceptional illustrations comparing treatment by exposure and occlusive pressure dressings.

The loss of exudate from the burn wound is approximately the same with the use of the exposure method as with the use of occlusive pressure dressings. The average healing time for second degree burns is 16 days. Third degree burns are usually ready for grafting when the surrounding partial thickness burns are healed. Most eschars over the joints of the hand and other flexor surfaces should be excised by the eighth to the tenth day. All eschars should be excised by the twenty-first to the twenty-sixth day.

Cerebral Traumata — Concept and Valuation of Psychophysiologic Aftermaths

Lewis J. Siegal, DIS. NERV. SYSTEM., XIV:163-171, June 1953.

In keeping with the scope of the subject matter and its discriminative application to the many sided aftermaths which have been respectively dealt with as occurring after particularized head injuries, reference to specific cerebral localizations and related treatment had not been included in this treatise.

Traumata to the skull and/or brain may precipitate neurotic changes in certain instances or may extend into lasting pathological alterations with implication of ganglion cells, nerve fibers, glia, blood vessels, and meninges. Laceration and hemorrhage with areas of cerebral softening may occur and varying gradations of encephalopathies and secondary degenerative changes may similarly complicate the picture.

The writer's observations have been presented, discussion of specific head injuries and their sequelae has been directed toward descriptive allocation and assessment of their neurologic and psychophysiologic patent and latent effects within specific categories, and the divers physiogenic and psychogenic dysfunctions as aftermaths flowing therefrom have been evaluated.

Nutrition and Blood Pressure

C. M. Wilhelmj, John McDonough and H. H. McCarthy, AM. J. DIGEST. DIS., 20:117-122, May 1953.

In man and experimental animals, it has been conclusively shown that an increase in body weight elevates blood pressure, while a decrease lowers blood pressure. In human subjects, it has not been proven whether body weight per se or the dietary constituents naturally chosen by obese subjects (high carbohydrate and/or fat and low protein) are the direct causative factor influencing the blood pressure.

In normotensive and hypertensive human subjects and dogs, most of the evidence indicates that high protein diets do not elevate or low protein diets decrease the level of the blood pressure. In normotensive and hypertensive rats, the blood pressure level varies directly with the level of protein intake and the evidence suggests that the synthesis of ACTH may be the link between the level of protein intake and the blood pressure in this species.

The available evidence indicates that carbohydrate and fat influence blood pressure only insofar as they influence body weight. High fat diets combined with minimal kidney lesions produce a necrotizing arteritis in dogs, but elevation of blood pressure is not a constant finding.

High sodium chloride ingestion combined with an otherwise normal diet does not cause significant elevation of the blood pressure of normal dogs, but does elevate the blood pressure of normotensive or hypertensive rats.

In some human hypertensives, restriction of sodium intake causes marked lowering of blood pressure, while others are not affected. It seems likely that those hypertensives

who show a lowering of pressure with salt restriction belong to a group where overactivity of the adrenal cortex is the causative factor.

The Nature of the World Health Organization

Henry Van Zile Hyde, PUB. HEALTH REP., 68:601-605, June 1953.

The purpose of the World Health Organization is to reach out a helping hand to the world with trained personnel and with scientific, practical knowledge and skills for the promotion of human health. A World Health Assembly composed of representatives of all the member states meets annually as the governing body of the World Health Organization. It determines the policies, votes the budget, and assesses the members. The World Health Assembly has divided the world into six regions in order to decentralize operations and, to a degree, policy development. In each of these regions there is a regional office and a regional committee.

Through its decentralization, WHO is brought nearer to the people and to the governments it serves, being more responsive to their needs. The World Health Organization exists in order to render service, first, to the world at large and, second, to its individual members — the governments of which it is composed.

The World Health Organization is not working alone. Rather, it is the coordinating force in a complicated structure of many agencies. Under its constitution it is the "coordinating and directing authority in international health work."

Muscle Action Potentials in Polymyositis

F. Buchthal and P. Pinelli, NEUROLOGY, Vol. 3, 424; June 1953.

Diagnosis of subacute and chronic polymyositis is extremely difficult since symptoms are nonspecific, and often the diagnosis must be based on muscle biopsy. The degree of atrophy that occurs varies according to the duration and severity of the disease, the inflammatory condition sometimes persisting for several years. Regeneration may occur or dystrophic changes take place. It is known that in muscular dystrophies the mean duration of muscle action potentials is decreased while it is greatly increased in lower motor neuron lesions. The purpose of this study was to examine the muscle potentials in polymyositis in the hope that they might contribute to the knowledge of dystrophic changes in muscle.

Eleven subjects with histologically verified polymyositis were used. When compared with normal subjects, this group showed a significant decrease of up to 60 per cent in the mean duration of the muscle action potentials. There was also an increased occurrence of the diphasic action potentials of short duration.

Factors which could account for the changes in the muscle action potentials were discussed. The most likely explanation was a general increase in the propagation velocity of the impulse over the muscle fiber combined with a reduction in the functional length of the fiber.

What You Can Do about Emotional Fatigue

Edward Podolsky, NURSING WORLD, 127:18-19, 40, June 1953.

Fatigue is a normal part of everybody's life. It has a rhythm of its own and it rises to normal peaks daily, weekly, annually, and possibly at longer intervals. There are many types of fatigue. Some of these are the result of expenditure of muscular energy, stress and strain, and emotional exhaustion induced by fear, anxiety, and mental upset.

Fatigue of the body and fatigue of the mind are two different things. A tired muscle will ache, but the only symptom of a tired brain is a disinclination for mental exertion. Emotional fatigue is a disorder which affects almost exclusively the ambitious, the spirited, and the strong willed, who suffer from a sense of duty or out of sheer enthusiasm drive their minds beyond the limit of safety.

The author gives the diagnostic signs and symptoms of emotional fatigue, and the therapeutic procedures for correcting or overcoming this type of tiredness.

In closing, it should be stated that the problem of fatigue is a very important one. There are various factors which enter into making a feeling of tiredness; age, degree of security, the sense of being exploited, or of being deprived of freedom. The day or so off in the week, and the weeks off in the year are by common agreement not only pleasurable, but essential to the best effort.

How to recuperate from fatigue? Complete rest and relaxation for some, a change of effort in a new direction for others, and the application of the principles of mental hygiene for still others are to be considered. In general, it is the problem of the capacity for spontaneity and what to do about it.

Animals in Psychological Research — I

Frank A. Beach, BULL. NAT. SOC. M. RESEARCH, 7:2-6, May-June 1953.

Man has aptly been called "the learning animal," and in his intellectual characteristics more than anything else he differs from other mammals and lower vertebrates. But in spite of this difference he does not seem to learn in any unique or qualitatively distinct way.

Man can form more complex habits than any other animal. He can remember longer and can usually learn more rapidly. But the basic features of his learning are the same as those seen in the learning of other animals. That is why studies of learning, differences between species throw light upon the nature of human learning.

The author discusses types of learning, differences between species and effects of learning. Studying the behavior pattern of animals during a learning situation gives a better understanding of the learning problems and methods of the human individual.

Poliomyelitis VII Gastro-intestinal Disturbances: Their Relationship to Lesions in the Hypothalamus

A. B. Baker, Ian A. Brown and Sam Cornwell, J. NERV. & MENT. DIS., Neurological Problems in the World in 1953, 116:715-725, December, 1953.

A pathologic study was undertaken of 15 cases of bulbar poliomyelitis in which gastro-intestinal

lesions were observed at autopsy. These lesions consisted of petechiae, ulceration, gross hemorrhage and distension.

In cases with gastro-intestinal lesions, the most severe damage in the hypothalamus was in the paraventricular and tuberal nuclei. This was particularly true of those cases with gastric hemorrhage.

Acute gastric hemorrhage in bulbar poliomyelitis constitutes medical emergency and must be watched for constantly in all cases.

Gastric distention usually occurs during the subacute phases of the illness and is often precipitated by stress situations. It may account for some of the delayed deaths in patients who are on the road to recovery.

The Psychosomatic Aspects of Obesity

Hilde Bruch, J. MT. SINAI HOSP., XX:1-15, May-June 1953.

The condition of overweight is generally considered to be undesirable and is the object of continuous effort at reducing.

From a clinical point of view it is necessary to differentiate between two types of overweight; a purely constitutional type which is an expression of a variation in body build, and a symptomatic type which is an expression of emotional maladjustment and leads to severe degrees of obesity, which also requires a constitutional predisposition. Psychological factors play a role in the development of obesity. Socio-psychological problems are created by the state of obesity.

Success or failure in reducing depends, among other factors, on the meaning of weight reduction for the patient. To the adequately adjusted overweight person it is a rational task with the main goal of losing weight. Even then it is not easy and simple and many patients need support and supervision.

To the emotionally disturbed obese person weight reduction has an irrational meaning, namely, that of fulfilling exaggerated day dreams of success and achievement. For such people reducing cannot be considered a harmless procedure. If rigidly enforced it may precipitate serious mental disturbance, even psychosis. Weight reduction should be preceded by a corrective appraisal of the aspiration level.

Foreign Abstract

Chiropractice Enters the Curriculum of the School of Medicine in Paris

V. Le Lorier, MEDÉCINE ET HYGIENE, May 11, 1953. *(Translated and abstracted from the Swiss publication by Signe Brunnstrom.)*

A decree dated February 11, 1953, establishes instruction in Chiropractice in medical schools in France; this instruction to be given only to students enrolled in a regular medical course. The professor at the school of medicine employs one or more persons specializing in chiropractice work under his supervision in teaching the medical students.

Indications for the use of chiropractic technics are briefly discussed —mainly for orthopedic and rheumatic conditions. The medical faculty does not endorse the chiropractice doctrine as such.

Book Reviews . . . . .

Rehabilitation of the Physically Handicapped. *By Henry H. Kessler, M.D., Medical Director of the Kessler Institute for Rehabilitation, West Orange, N. J. Revised Edition. Cloth binding; price $4.00. Pp. 275. Columbia University Press, New York, N. Y., 1953.*

Rehabilitation of the Physically Handicapped is a revised edition of a book by the same title and author originally published in 1947. Doctor Kessler is a distinguished surgeon who has devoted his talents to rehabilitation for many years. His experience covers civilian and military practice. He is Director of The Kessler Institute for Rehabilitation in West Orange, New Jersey.

This is a reference work that is concerned more with the philosophy of rehabilitation than with the technics of practice. The revised edition contains new material particularly on vocational aspects. It contains a very useful list of major centers and agencies for the handicapped. The book is well indexed. It is without illustrations.

The author is of the opinion that a public prejudice, inimicable to the welfare of the disabled, is commonplace and is the greatest obstacle to utilization and expansion of rehabilitation services. He recommends demonstration of the value and effectiveness of the disabled to combat this prejudice. He gives due credit to workmen's compensation efforts, but the administration of this function is justly criticized because of its failure to concentrate on the restoration of the injured worker to gainful employment.

The author makes a plea that the individual be viewed from the standpoint of the whole man. In his discussion of physical fitness, he reviews the difficulties in establishing physical standards that will determine ability to work instead of the condition and status of anatomical segments.

This book is a splendid survey of present day accomplishments, problems and goals in rehabilitation, and is recommended to all workers in this broad field. The cause of rehabilitation will be advanced immeasurably when a book of this type is also called to the attention of people not engaged in the work of rehabilitation. It is equally well suited to this purpose.

Surgery for Nurses. *By James Moroney, M.B., Ch.B., F.R.C.S. (Eng.), L.R.C.P. (Lond.), Visiting Consultant Surgeon, Clatterbridge General Hospital, Cheshire, and Broadgreen Hospital, Liverpool. Hunterian Professor, The Royal College of Surgeons of England. Examiner in Surgery to the General Nursing Council for England and Wales. Formerly House Surgeon and Surgical Registrar and Tutor, Liverpool Royal Infirmary. With a Foreword by Miss Dorothy M. Smith, O.B.E., Chairman of the General Nursing Council for England and Wales. Matron, Guy's Hospital, London. Second Edition, Illustrated. Cloth. Price, $6.00. E. & S. Livingstone Ltd. Edinburgh and London, 1952.*

This book was written for the nurse by a qualified English surgeon to be used as a textbook for the

student and as a reference book for the graduate nurse. The topics discussed include the usual surgical concepts and conditions found in any good textbook of surgery with special introductory chapters concerning the nurse's role in medical care. The author has made many changes, presenting the latest information on anesthetics, thoracic, cerebral and ophthalmic surgery, the antibiotics, burns, and radiotherapy.

The book is written in a simple and direct manner. Although the presentation is brief, the signs and symptoms necessary for diagnosis, and the role of the nurse in pre- and postoperative treatment are discussed adequately. Where physical medicine procedures are of value, the author points out the need in the over-all treatment of the patient. Especially good are the references to proper positioning in paraplegics and after chest surgery, to orthopedics, and to the management of amputees and those patients with metastatic disease.

A list of books and periodicals from which the many fine illustrations are acknowledged serves the purpose of a bibliography. The book may be well recommended as a reference book to the physical and occupational therapist as well as the nurse.

Recurrent Dislocation of the Shoulder. *By James A. Dickson, M.D., Chief, Department of Orthopedic Surgery, Cleveland Clinic and Cleveland Clinic Hospital; Alfred W. Humphries, M.D., Department of Orthopedic Surgery, Cleveland Clinic and Cleveland Clinic Hospital; and Harry W. O'Dell, M.D., Chief, Department of Orthopedic Surgery, Akron Clinic. Price $4.50. Pp. 143; 78 illustrations. Published by The Williams and Wilkins Co., Baltimore, 1953.*

This monograph first considers the phylogeny, ontogeny and anatomy of the shoulder joint. There follows a chapter on functional dynamics which endeavors to relate the foregoing sections to those factors conducive to an initial or recurrent dislocation.

A full discussion of the most common pathological changes is given, but the authors are unable to state which factor makes any one dislocation become recurrent.

The longest chapter is devoted to surgical treatment and the many procedures are classified as follows: bone blocks, repair of anterior capsule, suspensory operations and transplantation of muscle. Detailed descriptions of the more commonly employed operations, such as the Bankhart and Niccola, are accompanied by numerous plates. It is unfortunate, as the authors themselves admit, they are unable to establish any preferred procedure for any given case.

The book concludes with a section on posterior dislocation and a review of rotary motion. A bibliography of 168 entries is appended.

To a physical therapist the lack of any discussion of postoperative care is a noticeable omission. Its greatest value would seem to be for the surgeon who is interested in a concise review of the problem.

Muscle Relaxation as an Aid to Psychotherapy. *By Gerald Garmany, B.Sc., M.B., Ch.B., M.R.C.P., D.P.M., Physican to Psychiatric Department, Westminster Hospital, London, England, and Westminster Children's Hospital; Lecturer in Psychiatry to Westminster Medical School. Cloth and paper binding; price 5/6 (cloth), 3/6 (paper). Pp. 65. Actinic Press, Ltd., London, England, 1952.*

This monograph on "Muscle Relaxation" is exceptionally well written and will be readily understood and read with interest by all who are a part of the medical team, especially the physical therapist. This small book has only 65 pages, but includes characteristics and symptoms of emotional disturbances and muscle tension, then describes in detail, though simply, what appears to be an excellent method of producing relaxation. The general principles used differ little from those of Edmund Jacobson, although they are presented in a form which is much more quickly and easily read and understood.

Gerald Garmany is well qualified to write such a book, as he is the Physician to the Psychiatric Department, Westminster Hospital and Westminster Children's Hospital, Lecturer in Psychiatry to Westminster Medical School, and Recognized Teacher, University of London. He has worked closely with physiotherapists of Westminster Hospital, who have collaborated with him and added their experiences to his own.

The author stresses the importance of emotional detachment, keeping treatment strictly on a physical plane, and the importance of a fervent belief in the value of treatment on the part of the physical therapist. He also stresses that psychotherapy is nearly always required in addition to the purely physical approach. It is of great importance to restrict the work to the patient likely to benefit from it, being careful to keep in mind certain limitations to this form of treatment.

The book is not illustrated, but contains a complete one page table of contents, references at the bottom of the pages, and a glossary of terms at the end of the book. It is a book that might well be added to the library of all physical therapists who are working with psychiatric patients, and will be of interest and of value to many others in the medical field.

The National Health Service in Great Britain. *By James Stirling Ross. Cloth; price $7.00. Pp. 398. Oxford University Press, New York, N. Y., 1952.*

It is stimulating to read a Britisher's viewpoint of the National Health Service. The author's opinion is that a nation's health can be satisfactorily cared for only by a welfare state.

He defines the term "welfare state." Little space is given to the comparison of nationalized medicine with the practice of medicine as we know it in the United States. The book is not argumentative, but is objective. The book presents a developmental history of medicine in England, Wales, and Scotland.

The history begins in 1847, with presentation of the socio-medical problems that gradually led to a changing system of medical care. Great detail is given to the changing legislation from the beginning to the present time. The social and economic reasons are given for legislative regulations. The author seems to be well informed on his subject and presents a very factual account.

Discussion of the "Health Service in Action, 1948-51," is divided into sections on administration, hospitals, general practice, pharmaceutical service, dental service, etc. Physician's problems, patient's problems, and legislative problems are dis-

cussed as they arise, and explanation is given as to how those problems are handled.

A final chapter on opinion in America is interesting.

The book when read critically provides the reader with much helpful information no matter what his opinions are on the national system of medical practice. The book's detail should delight those who love history.

Gout and Gouty Arthritis. *By John H. Talbott, M.D., Professor of Medicine, University of Buffalo School of Medicine; Physician-in-Chief, Buffalo General Hospital, Buffalo, New York. Cloth; price $4.00. Pp. 92; illus. 32. Grune & Stratton, Inc., New York, N. Y., 1953.*

This monograph contains most of the available information pertaining to gout. The author has presented the material in a lucid, concise manner emphasizing what is not known as well as what is known about gout. He also stresses the difference between gout, which is a generalized condition, and gouty arthritis, which is a joint manifestation associated with elevation of the blood urate.

Gout is not a disappearing disease. The author mentions pertinent points to be sought for in the history, physical examination, and laboratory data which will suggest this diagnosis. He emphasizes the importance of an early diagnosis and recommends that treatment be continued during the quiescent period.

Dr. Talbot is well qualified to present this material which is the result of a twenty year personal study of gout. The monograph can be used as a reference book since it has a comprehensive bibliography as well as much specific information in the content.

The illustrations, graphs, charts, and roentgenograms have been reproduced clearly. The paper is glossy and the type is easily read. From this small monograph, the physical therapist can get a good understanding of gout and recognize the role that physical therapy plays in rehabilitation of the gouty patient.

The reviews here published have been prepared by competent authorities and do not represent the opinions of the American Physical Therapy Association.

Abstractors for October

Helen J. Hislop

Louis Cotovsky

Coming Meetings

The Seventh Annual Meeting of the American Academy for Cerebral Palsy will be held on October 30-31, 1953, at Ft. Worth, Texas, at the Western Hills Hotel.

The Scientific sessions are open to members of the medical or allied professions. Guests shall be required to pay a registration fee.

The 1953 Annual Convention of the National Society for Crippled Children and Adults will be held in Chicago from November 12 to 14.

The American Occupational Therapy Association will hold its Thirty-Sixth Annual Conference, November 13 to 20, 1953 at the Sham rock Hotel, Houston, Texas.

Classified WANT-ADS

WANTED: Physical therapist (female) for full or part-time work in orthopedic surgeon's office. Write to Daniel B. Eck, M.D., 144 S. Harrison St., East Orange, N. J.

WANTED: Qualified female physical therapist for orthopedic surgeon's office. Salary excellent. Position available immediately. Donald C. Somers, M.D., 3919 John R. Street, Detroit 1, Michigan.

POSITION AVAILABLE: For registered physical therapist as assistant in department of a 450-bed modern general hospital. Salary open. Apply: J. M. Daniel, Superintendent, Columbia Hospital, Columbia, South Carolina.

QUALIFIED PHYSICAL THERAPIST interested in crippled children work in public health field wanted for immediate placement. Also opportunity for physical therapy-occupational therapy coordinator. Present staff consists of one physical therapist and two occupational therapists. Contact Jack Sabloff, M.D., Director, Division of Crippled Children's Services, State Board of Health, Dover, Delaware.

WANTED: PHYSICAL THERAPIST to work with preschool palsy children. Desire person interested in working in a rehabilitation team. Program affords all forms of therapy plus nursery-kindergarten education. Experience in cerebral palsy not necessary as we will train. Salary open. Three weeks' vacation, legal holidays, and nursery closed Christmas week. For information contact: Personnel Director, Michael Reese Hospital, 29th Street and Ellis Avenue, Chicago, Illinois.

WANTED: QUALIFIED female physical therapist to work in established, well equipped department of a hospital for orthopedically handicapped children. Vacation, sick leave with pay, and retirement benefits; 5-day week; living quarters provided if required. Write: John J. Carroll, M.D., Superintendent, Massachusetts Hospital School, Canton, Massachusetts.

POSITION OPEN for 2 physical therapists: 35-hour week, school holidays, vacation, sick-leave privileges. Write to: San Antonio Cerebral Palsy Center, 305 Austin Street, San Antonio, Texas.

PHYSICAL THERAPIST NEEDED for work in beautiful children's orthopedic hospital located in heart of historic west. Excellent salary, plus full maintenance, 15 days vacation, 15 days sick leave, 40-hour work week. Climate is warm and dry. Hospital has indoor and outdoor pools available to personnel. Contact Dr. W. L. MINEAR, Chief Surgeon, Carrie Tingley Hospital for Crippled Children, Truth or Consequences, New Mexico.

WANTED: QUALIFIED physical therapist to work in two-girl orthopedic surgeons' physical therapy clinic. Pleasant working conditions, loop location, 5-day week. Alternative Saturday mornings. Top salary. Write to Dr. F. Glassman, Ste. 2117, 109 N. Wabash, Chicago 2, Illinois.

WANTED: ASSISTANT PHYSICAL THERAPIST—Female for 336-bed general teaching hospital. Salary varies with experience. Two weeks vacation and retirement plan. This department treats in- and out-patients both children and adults, and types of cases are diversified. This department is part of a Medical Center located near Syracuse University, which affords excellent opportunity for graduate educational work. Write Martha Lockman, Assistant Administrator, Syracuse Memorial Hospital, 736 Irving Avenue, Syracuse, New York.

WANTED: PHYSICAL THERAPIST for large teaching hospital. Write, S. Mead, M.D., Barnes Hospital, St. Louis, Mo.

QUALIFIED PHYSICAL THERAPIST: female nurse to give physical therapy in homes and orthopedic supervision to visiting nursing staff. Five-day week. Four weeks' vacation. Apply Director Victorian Order of Nurses, 1246 Bishop Street, Montreal, Canada.

WANTED IMMEDIATELY—2 qualified female physical therapists. General hospital clinic with outpatient service. No cerebral palsy, polio or mental cases; 5-day, 40-hr. week. Holiday, sick leave and vacation privileges. Quarters optional, laundry furnished. Good beginning salary, annual increases. Write to: Miss Mary Mason, Physical Therapy Dept., The Johns Hopkins Hospital, 601 N. Broadway, Baltimore 5, Maryland.

WANTED: QUALIFIED physical therapist as Assistant to Chief Physical Therapist in 322-bed hospital. Active department includes polio work, rehabilitation and Crippled Children's Clinics. Pleasant working conditions. Permanent opening with complete maintenance, social security, paid sick leave, and vacation and other personnel benefits. For complete details write Mr. F. C. Curran, Director Eastern Maine General Hospital, Bangor, Maine.

(Continued on back cover)

Classified WANT-ADS

RATES

The rate per insertion is 75c per line. Typewrite your advertisement carefully and count 50 characters and spaces per line.

ALL WANT-ADS MUST BE PAID FOR IN ADVANCE. Make checks or money orders payable to the American Physical Therapy Association.

Institutions or physical therapists who do not wish their identity known may arrange for Blind Ad Code No. All such want-ads must include the following which will be counted as 2 lines:

Address replies to .. .. care of **The Physical Therapy Review, 1790 Broadway, New York 19, N. Y.**

IMPORTANT

It is understood and agreed that the publisher shall have the right to reject or change the wording of any advertisement which in the opinion of the Editorial Board shall not be in agreement with the ethical standing of this publication.

PHYSICAL THERAPIST WANTED to work half days with cerebral palsy patients, half days with general orthopedic patients in 140-bed children's hospital and orthopedic center. Limited experience in cerebral palsy desirable. Postgraduate training at recognized center will be available for properly qualified individual who is accepted for staff membership. Excellent working conditions, 3-week vacation. Write to Administrator, Mary Free Bed Guild Convalescent Home, 920 Cherry St. S. E., Grand Rapids, Mich.

PHYSICAL THERAPIST, registered, wanted in 113-bed hospital located in suburban community near Chicago, Ill. Active department. Excellent salary, vacation and sick leave benefits. Apply Personnel Director, Highland Park Hospital, Highland Park, Ill.

WANTED: PHYSICAL THERAPISTS for Ohio cerebral palsy centers. In or near metropolitan areas. Excellent salary, month's vacation, Christmas holidays, educational leave. Write State Director, United Cerebral Palsy of Ohio, 741 College Avenue, Columbus, Ohio.

Position Wanted

QUALIFIED PHYSICAL THERAPIST, woman, degree in physical education, certificate in physical therapy, and degree in education, with 15 years experience in directing, supervising and teaching, with specialization in several branches of physical therapy, desires a position of responsibility. Address replies to Post Office Box 81, Atlantic Highlands, New Jersey.

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